Feb. 15, 1952

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Paper TRADE JOURNAL

WOOD PULP
G

Established 1886

"We achieve through Liberty."
ROBERT BROWNING

Constantly envisioning new horizons, Pulp and Paper will assuredly do its part to help America win the continuing vital battle of production. The industry has set important goals for itself and is determined to produce on the scale—and in the progressive manner—that is possible only in a free economy.

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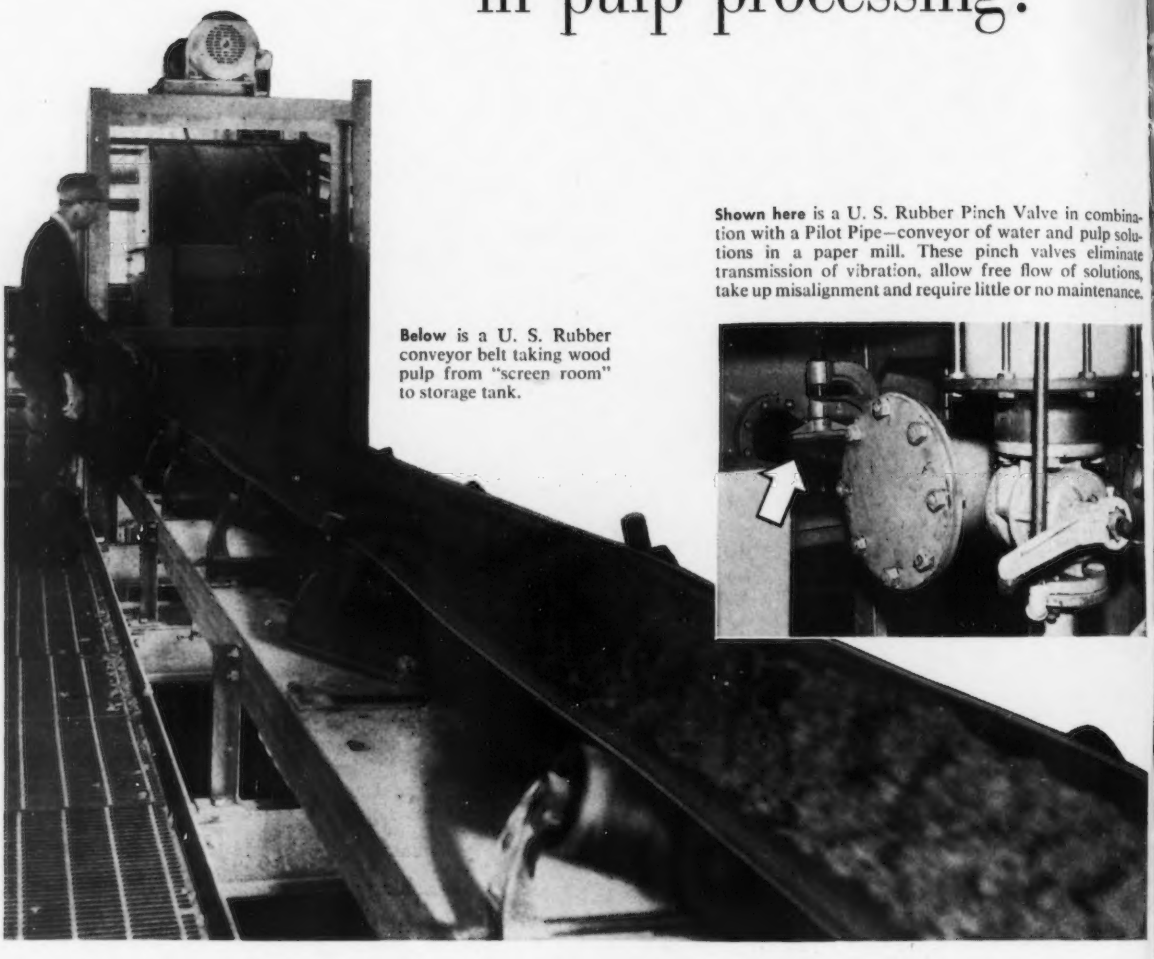
How does U. S. Rubber help in pulp processing?



Below is a U. S. Rubber conveyor belt taking wood pulp from "screen room" to storage tank.

Shown here is a U. S. Rubber Pinch Valve in combination with a Pilot Pipe—conveyor of water and pulp solutions in a paper mill. These pinch valves eliminate transmission of vibration, allow free flow of solutions, take up misalignment and require little or no maintenance.

A manufacturing process in a well known Southern paper plant is no longer necessary.

Formerly the pulp was machine-dried and hand-stored, requiring a 4-man operating crew, extra storage space and handling. Now, with this new conveyor belt system, wet pulp goes directly to the storage tanks and is kept as "slush pulp" until ready for the machines. For more information about the savings in space, time and manpower you can expect with U. S. Rubber belting, write to address below.

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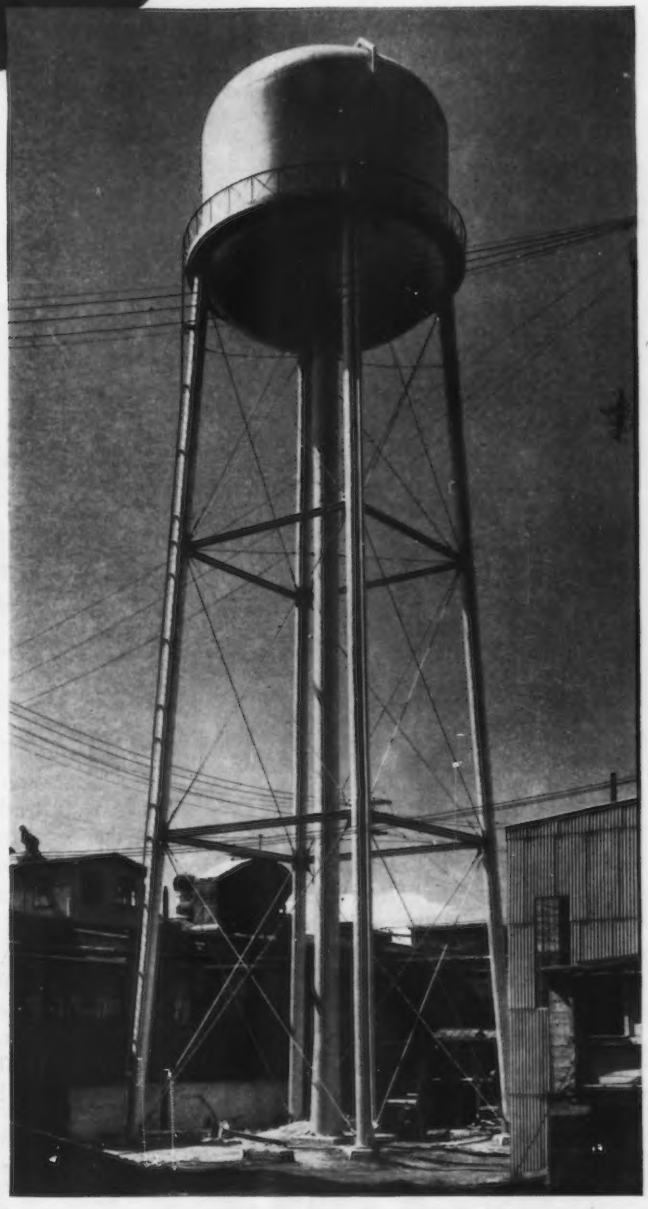
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

A WATER SUPPLY THAT'S *ALWAYS* READY WHEN YOU NEED IT

The 125,000-gal. Horton elevated water tank at the Dunn Paper Company is 100 ft. to bottom. A portion of its capacity is used to supply process water and the remainder of the water is held in reserve at all times for fire protection.



The Dunn Paper Company—manufacturers of machine glazed bleached, semi-bleached, and unbleached sulphite and kraft specialties—recently installed the Horton elevated tank shown on the right at their Port Huron, Michigan plant. This 125,000-gal. steel structure supplies water for fire protection and also for various paper making processes.

Like many plants, Dunn Paper Company, installed an *elevated* tank to provide a dependable supply of water whenever it is needed and to guard against interruptions in production. These are proven advantages because an *elevated* water supply is backed by gravity pressure. Service is assured 24 hours a day!

Horton elevated water tanks with ellipsoidal-bottoms are built in standard capacities from 15,000 to 500,000 gallons and Horton Watersphere in sizes from 25,000 to 250,000 gallons. The welded steel construction of Horton tanks provides smoother surfaces for easier painting. Maintenance is reduced to a minimum.

For more information or quotations on Horton elevated tanks and their profitable application in your plant for either general service or fire protection—write our nearest office without obligation. Please include type of service desired, height to bottom, capacity and location.

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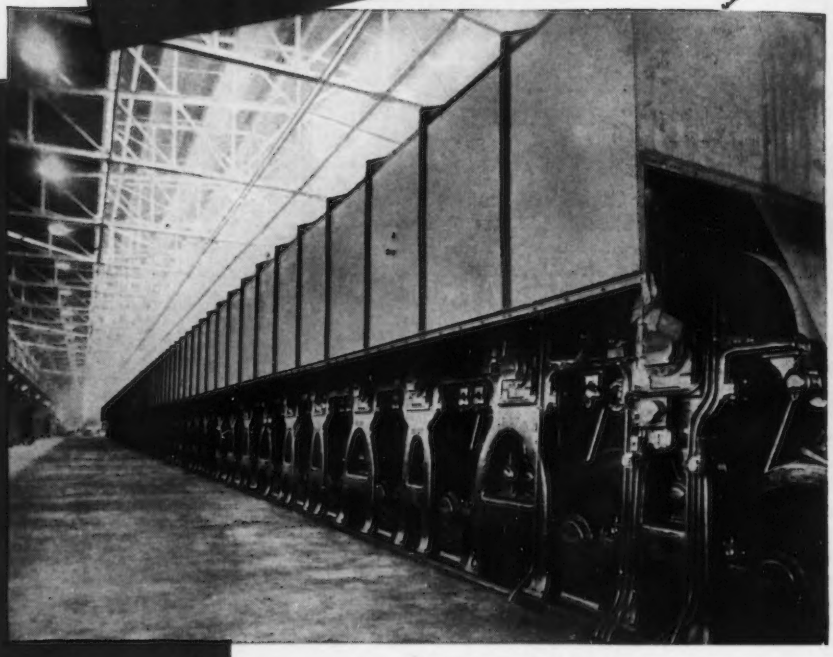
MORE PAPER ...LESS COST

...when dryer rolls are lubricated with TEXACO URSA OIL X★★



Leading paper mill operators will endorse the fact that *no other oil equals Texaco Ursa Oil X★★*! Here's a fully detergent and dispersive oil with extra resistance to oxidation. It keeps bearings clean—in "like new" condition for years. It won't sludge or foam. It prevents accumulations of paper dust and water in oil lines or bearings . . . prevents rust whether machines are running or idle.

Texaco Ursa Oil X★★ thus virtually eliminates shutdowns necessary when ordinary oils are used. It also saves you costly bearing replacements . . . assures full production and lower costs. *Texaco Ursa Oil X★★* is approved by leading paper machine and bearing manufacturers.

In your enclosed reduction gears, use *Texaco Meropa Lubricant*. It has outstanding EP characteristics, resistance to oxidation, thickening and foaming. Rely on it to assure longer gear life, lower maintenance costs.

A Texaco Lubrication Engineer will gladly help you get greater production and reduce costs through effective lubrication. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

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Faithfully yours 50 *for Fifty Years*

TUNE IN . . . TEXACO STAR THEATER starring MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA radio broadcasts every Saturday afternoon.

Paper TRADE JOURNAL

VOL. 134 FEBRUARY 15, 1952 No. 7

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PUBLISHED EVERY FRIDAY

LOCKWOOD TRADE JOURNAL CO., INC., 15 West Forty-Seventh Street, New York 36

Phone: PLaza 7-2370

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Entered as Second Class Matter at the post office at East Stroudsburg, Pa., under Act of Congress of March 3, 1879. Publication Office at Lockwood Trade Journal Co., Inc., 34 North Crystal St., East Stroudsburg, Pa. Printed in U.S.A. Copyright 1952 by Lockwood Trade Journal Co., Inc. PAPER established Feb. 17, 1899, combined with PAPER TRADE JOURNAL Nov. 16, 1899. PAPER established Sept. 21, 1910, combined with PAPER TRADE JOURNAL February 19, 1926. All rights to the above titles reserved. Contents of PAPER TRADE JOURNAL, including all articles, illustrations, etc., are copyrighted and may not be reprinted except by permission. PAPER TRADE JOURNAL is indexed in Industrial Arts Index and Engineering Index. Also publisher of LOCKWOOD'S Annual DIRECTORY OF THE PAPER AND ALLIED TRADES.

THIS WEEK

A thorough study of the effect of hypochlorite bleaching and alkali treatment of Eucalypt Groundwood indicates that substantial increases in strength as well as improvement in brightness are possible. Results will be found in "Strengthening Eucalypt Groundwood by Alkalis and Bleaching With Hypochlorites" by F. R. Neale, A. J. Pearson and L. J. Somerville of Australian Newsprint Mills, Ltd.

Simpson Logging Co. in its efforts to thoroughly integrate its operations completed an insulation board mill. Like all industry each new mill advances the art, thus we present Charles L. Walton's description of one of the latest plants making this specialty product.

REMEMBER THESE DATES

FEB. 19-22: American Pulp & Paper Assn., Annual Meeting, Waldorf-Astoria Hotel, New York, N. Y. Starts on Tuesday this year. 75th Annual Dinner Thursday, Feb. 21.

FEB. 19: Maine Alumni Luncheon, 12:30, Biltmore Hotel, New York, N. Y.

FEB. 20: M.I.T. Paper Industry Alumni luncheon, Engineers Club, New York, N. Y.

FEB. 20: Salesmen's Assn. of the Paper Industry, Annual Meeting and Luncheon, Waldorf-Astoria Hotel, New York, N. Y.

FEB. 18-21: Technical Assn. of Pulp and Paper Industry, Annual Meeting, Commodore Hotel, New York, N. Y.

MARCH 16-18: American Institute of Chemical Engineers, Atlanta Biltmore Hotel, Atlanta, Ga.

MARCH 24-26: The National Paper Trade Assn., Annual Meeting, Waldorf-Astoria, New York, N. Y.

MAR. 26-28: Woodlands Section, Canadian Pulp and Paper Assn., Annual Meeting, Mount Royal Hotel, Montreal, Que., Canada.

MAR. 30-31: Packaging Machinery Manufacturers Institute, Semi-Annual Meeting, Hotel Dennis, Atlantic City, N. J.

MAY 5-8: Third Coating Conference of the Technical Assn., of the Pulp and Paper Industry, at the Sherman Hotel, Chicago, Ill.

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A Screen-Vat Assembly Well Worth Considering

Operators considering the erection of new board mills, the installation of additional cylinder machines, or the rebuilding of old ones, should seriously consider this special B-C Screen-Vat assembly.

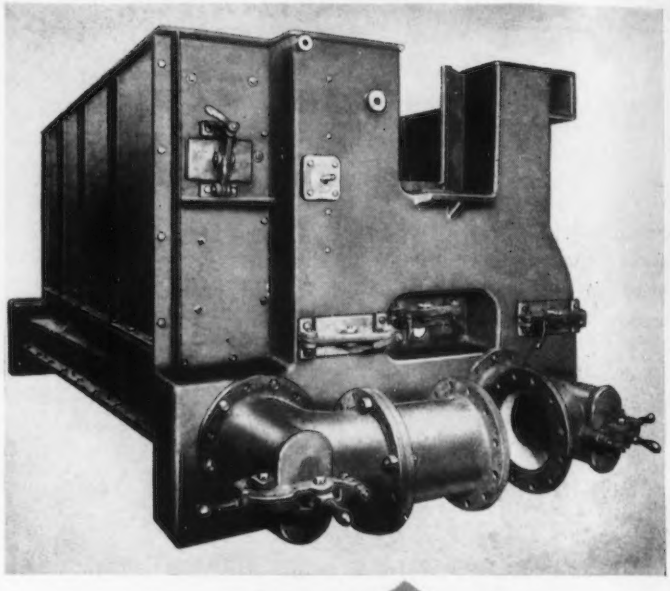
Shartle Selectifier Screens ahead of the vats (both liner and filler) for final cleaning and fiber bundle breaking. No mix boxes required.

Black-Clawson precision built vats incorporating vat circles, sides and partitions individually engineered for maximum efficiency and strength to withstand hydraulic forces at work.

Each vat individually engineered for your specific papermaking requirement. Over seventy-five years of experience in paper machine "know-how" incorporated in every vat that leaves the Black-Clawson plant.

Mills that install Selectifier Screens in lieu of flat screens—B-C "Job Engineered" Vats with specially designed inlets—will benefit far more than they realize.

Full particulars upon request.



Black-Clawson Uni-flo Vat

Shartle Selectifier Screen

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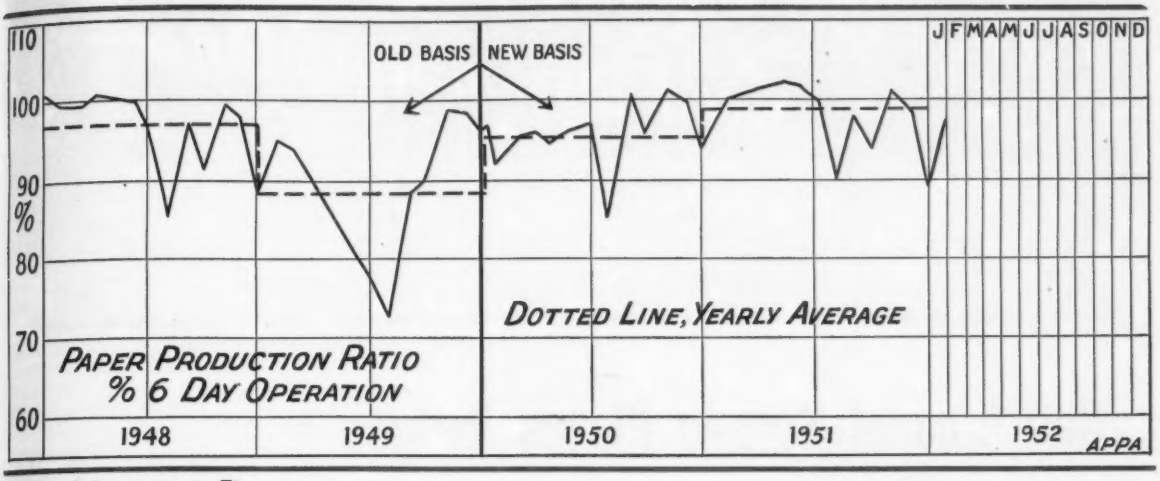
OUR BUSINESS



Brief of Important Figures

Source		WEEK ENDING Feb. 2, '52	Jan. 5, '52	Feb. 3, '51
	Production			
APPA	Paper Production Percent Capacity[2]	97.3	93.4	100.2
	Unbl. Kraft Paper Production Percent	91.3	91.7	98.7
NPA	Paperboard Operating Ratio Percent Inch Hours	85	64	103
		Dec. 1951	**Nov. 1951x**	**Dec. 1950**
APPA	Paper Production* (Except Newsprint and Building Papers) ....Tons	837,000	897,269	795,000
	New Orders ....Tons	807,000	819,334	792,000
	Unfilled Orders ....Tons	884,500	914,463	862,300
	Shipments ....Tons	836,000	881,877	805,000
		Jan. 1952	**Dec. 1951**	**Jan. 1951**
NPA	Paperboard Production ....Tons	903,461	757,914	1,176,679
	New Orders ....Tons	962,138	768,320	1,349,991
	Unfilled Orders ....Tons	405,520	358,720	761,828
	Our Customers Activities Index[1]	**Latest Mo.°**	**Previous Mo.°**	**Year Ago°**
FRS	Manufactures Total Index	228	230	226
	Durable Mfg. Index	275	275	260
	Nondurable Mfg. Index	189	193	197
	Chemical Products Index	302	304	284
	Mfg. Food Products Index	160	176	163
	Printing and Publishing Index	183	181	182
ODC	Magazine Advg.-Printer's Ink Index	347	403	342
	Retail Sales Combined Adjusted Index	385.0	382.2	350.3
	Drug Index	250.0	253.1	231.5
	General Merchandise Group Index	406.2	399.0	371.2
	Grocery and Combination Index	459.1	445.9	401.8
	Prices Index			
BLS	Consumers Price Index[1]	188.6	187.4	176.4
	Wholesale all Commodities[3]	178.3	178.1	171.7
	Wholesale Foods[3]	188.8	189.4	175.2
	Commodities other than Farm Products and Foods[3]	166.9	166.7	163.7
	Wholesale Pulp and Paper[3]	201.1	200.5	178.7
	Purchasing Power of Dollar, Consumers Prices[1]	53.0	53.4	56.7
	General Activity Index			
FRS	Mfg. Production-Worker Payroll	429.4	432.7	414.6
	Unemployment Compensation Initial Claims (M)	948	902	907
	Miscellaneous Carloadings–Thousands of Cars	1,524	1,664	1,570
	Electric Output (Million KW hr.)	37,313	37,775	34,101
PTJ	Average 32 P & P Common Stocks as of Feb. 9	$36.71	$37.20	$38.33

[1] 1935-39 = 100 Unadjusted Index.
[2] 1926 = 100.
[3] New 6-7 day basis.
* For details see APPA Monthly Statistical Summary—December 1951 Estimated Figures.
° Latest Month Available on Request.
x Revised figures.

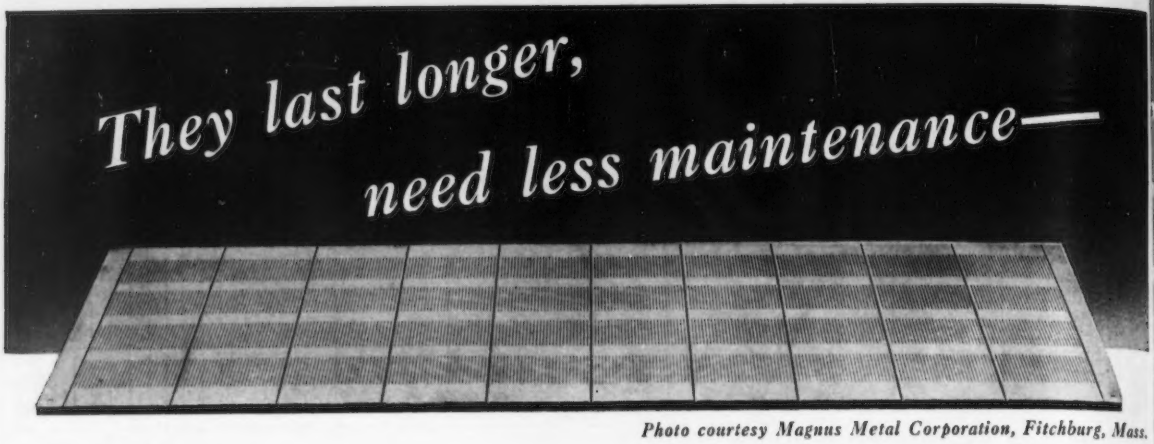


Photo courtesy Magnus Metal Corporation, Fitchburg, Mass.

Can Inconel Screen Plates Reduce Your Replacement Costs?

Nearly nine years ago, a Canadian mill decided to see if they could get longer service life from screen plates. Up to that time, the best screen plates tried had failed through corrosion or fatigue, after only about a year of service.

Then, in 1943, they tried screen plates of Inconel®. Today – *nearly nine years later* – these Inconel plates look as good as new.

This long plate life can be credited to two outstanding characteristics of Inconel – exceptional resistance to fatigue and corrosion by mill stocks.

Inconel is virtually unaffected by chemicals used in the pulp and paper mill. And – because Inconel does not readily work-harden – it is capable of withstanding severe vibration and shock which often cause other metals to fail through "fatigue."

For further information about Inconel screen plates, write directly to Magnus Metal Corporation, Fitchburg, Mass.

Right now the INCO Nickel Alloys are on extended delivery because so much is needed for defense. So, it's wise to anticipate your needs and place your orders (with necessary N.P.A. ratings) with your INCO distributor well in advance.

THE INTERNATIONAL NICKEL COMPANY, INC.
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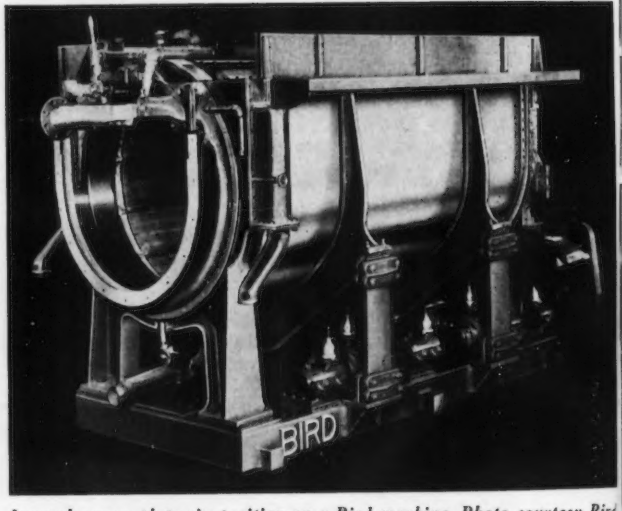

Inconel screen plates in position on a Bird machine. Photo courtesy Bird Machine Co., South Walpole, Mass.

EMBLEM OF SERVICE
NICKEL INCO ALLOYS
TRADE MARK

MONEL® • "R"® MONEL • "K"® MONEL • "KR"® MONEL • "S"® MONEL
NICKEL • LOW CARBON NICKEL • DURANICKEL®
INCONEL® • INCONEL "X"® • INCOLOY® • NIMONICS

Paper TRADE JOURNAL

TRENDS

Office of the PAPER TRADE JOURNAL,
Wednesday, February 13, 1952.

Fundamentally, there are two diverging lines of industry thinking about 1952's paper market. One school follows the opinions of economic experts which hold that the peak of demand will be reached by midyear, then taper off into a dip. Others reason that current easing is a temporary adjustment to be followed by a buying spurt as Defense industry dollars jingle in more pockets. Also a factor in this reasoning is the traditional good paper business of election year.

December Production Record

Both groups can find support for their stand in the December production figures shown in *Table 1*. Notable is the drop in production tonnage from the earlier month, also the percentage changes in daily average output between the two months. Backlog of orders registered a slight easing from the total of November, 1951, but an appreciable rise in printing papers, and a lesser one in coarse papers over December, 1950, backlog.

The Trend Sustained

With the exception of kraft papers which picked up a further backlog of 7,000 tons during January, the December trend is sustained for early 1952. The dip in unbleached kraft output to 91.3 percent of rated capacity during the week ended February 2, from 98.7 in the earlier week, does not signal a drop in kraft paper demand, in the opinion of industrymen. Since the backlog of orders is at a healthy level, the decline is assumed to be a temporary shift in machine-time within the industry.

Swedes Lift Pulp Export Tax

While the OPS and NPA Pulp and Paper groups argue the advisability of rolling back overseas pulp prices to the Canadian level, the Swedish Government cut away the source of U. S. irritation. In a move designed to step up exports to the U. S. and thus add to Sweden's dollar earnings, the Swedish Government removed the objectionable export tax on wood pulps sent to this and other dollar areas, as of February 1. Included in the tax-exempt dollar areas are Mexico, Venezuela and Cuba, it is reported.

The levy, which amounted to $35 per ton on first quarter shipments of cellulose to the U. S., was slashed during the fourth quarter of 1951 from 490 kronor to 200, a drop of about $70 per short ton. To other than dollar areas, the tax on bleached and unbleached cellulose amounts to 650 kronor per metric ton.

To Encourage Exports to U. S.

Pointing up the Swedish lack of fuels and certain raw materials which can be purchased on the dollar market at lower prices than those quoted elsewhere in the world, the Swedish Secretary of Commerce, John Ericsson, made clear in a late "Business News Letter" that exports must be boosted to avoid a cut in purchases. The main reason for the decline in dollar-earning exports was named by Mr. Ericsson as cellulose, who also said that since Marshall dollars are no longer available, and it is more important than ever that Sweden bend its efforts to boost exports to the dollar markets, his Government intends to encourage such exports in every feasible way.

Materials

Casein.—This market is reported as "steady to weak." In view of the limited buying interest here and abroad, the ample domestic supplies, an almost record supply in the Argentine for this time of year, and a constant flow of good quality imported product, the weakness deepens. It is felt by traders that a further drop in the Argentine floor is imperative, and domestic supplies are meeting competition.

Wholesale selling prices in New York City as reported by the Department of Agriculture are: French 20-22½c; Dutch 25-28c; Danish 24-28c; best quality 30-mesh acid type Argentine 27-29c; domestic standard 30 mesh, 27-29c; premium 20-30 mesh, 35½-38c, f.o.b. plants.

Gum Rosin.—Outlook for this market looks brighter, prices firmer.

Naval Stores Market Review Service for February 7 reported: "Medium grades steady. Inquiry improving. Sales 656 drums, mostly export. Aviation Supply Office opened bids yesterday for purchase of 1,800,000 lbs. N, WG or WW for delivery of 152,000 lbs. in 30 days, 648,000 lbs. in 60 days. Another invitation for bids to be opened February 18 for 1,152,000 lbs. of same grades; delivery of 432,000 lbs. in 75 days; 432,000 lbs. 120 days; and 360,000 lbs. 150 days has been made.

Weighted average prices of papermaking gum rosin grades in drums, f.o.b. plants, for the year 1951, were summarized by the NSMRS, U. S. Dept. of Agriculture, as follows:

Weighted Avg. Prices of Gum Rosin, Year 1951

(Based on the Daily Naval Stores Market Report)
(Dollars per 100 lbs. net weight)
Drums fob plants

Month	N	M	K
January	$8.93	$8.80	$8.79
February	9.14	8.82	8.97
March	8.90*	8.75*	8.74*
April	8.74*	8.74*	8.87*
May	8.90	8.91	8.94
June	9.22	8.91	9.00
July	7.71	...	8.37
August	8.43	8.35	8.35
September	8.80	8.84	8.58
October	9.14	9.10	9.04
November	8.52	8.90	8.15
December	8.05	8.08	7.98

* Includes sales of supplies obtained from CCC stocks.

—E.P.N.

Paperboard Production (Tons)*

	Feb. 2 1952	Jan. 26 1952	Feb. 3 1951	Month of January
Production	205,239	201,284	240,200	903,461
New Orders	236,845	187,558	345,524	962,133
Unfilled Orders	405,520	376,678	761,828	405,520
% of Activity	85	85	103	

* Source: National Paperboard Assn.

TABLE I

December Paper Production

	Production Tons	% Changes in Daily Avg. Production: December 1951 Compared with November 1951	% Changes in Daily Avg. Production: December 1951 Compared with December 1950	Orders Unshipped or Unmade (Tons): December 1951 Compared with November 1951	Orders Unshipped or Unmade (Tons): December 1951 Compared with December 1950
A. Printing Papers	280,000	— 6.0	— 3.2	— 7,945	+64,440
B. Fine Papers	116,000	— 5.4	+13.6	— 5,010	—26,235
C. Coarse Papers	296,000	— 8.1	+ 8.9	—12,002	+ 2,056
D. Tissue Papers	103,000	— 6.5	—11.5	n.a.	n.a.
E. Miscellaneous Papers	42,000	— 5.6	— 4.3	— 2,000	—21,230
F. Total, Groups A-E	837,000	— 6.7	+ 1.6	—29,963	+25,025
Total Paper, Newsprint, Bldg. Paper, Paperboard & Bldg. Board	1,897,000	2,047,562* Nov. 1951	2,101,542* Dec. 1950	n.a.	n.a.

Source: APPA. n.a.—Not available. * Revised.
December, 1951 had the same number of days as November, 1951 and December, 1950.

In The Paper Industry

WESTERN PRECIPITATION

COTTRELL EXPERIENCE IS UNSURPASSED

— Because Western Precipitation *pioneered* the first COTTRELL Installation in a Paper Plant!

In the design and installation of COTTRELL Electrical Recovery equipment there is no substitute for *experience.* And it is important to remember that the Western Precipitation organization not only pioneered the first successful COTTRELL installation made in *any* industry, *but also pioneered the first* COTTRELL *installation made in the paper industry.*

This installation, made over 30 years ago, blazed the trail for use of COTTRELL equipment for recovering dust and fume from black liquor furnace gases in modern paper plant operations.

Let us show you how Western Precipitation's consistent leadership in COTTRELL "know-how" assures you the most modern advancements and the most economical operations in YOUR electrical recovery operations.

◀ *Western Precipitation knows* COTTRELL *equipment as no other organization does, having pioneered the first commercial application of* COTTRELL *equipment made in any industry!*

◀ *Western Precipitation knows* COTTRELL *applications in paper operations because its widespread experience in this field dates from the pioneer* COTTRELL *installation made in the paper industry!*

◀ *Western Precipitation is able to give you an unbiased recommendation on your recovery requirements, for in addition to leadership in the electrical recovery field—Western Precipitation also leads in the mechanical recovery field with its widely-known* MULTICLONE *Mechanical Collectors. Western Precipitation installed the first MgO plant.*

Regardless of the size or nature of your dust or fume recovery application, let us study your requirements and make an unbiased recommendation based on over 30 years experience in the paper industry. Call, write or wire our office nearest you.

Whether *your* operations call for *electrical* recovery . . . or *mechanical* recovery . . . or *both* working in combination—Western Precipitation can design and install the type best suited to your needs—under *one* guarantee and *one* responsibility!

Write for descriptive literature on Western Precipitation products and experience.

Except for its wholly-owned subsidiaries, The Precipitation Corporation of Canada and The International Precipitation Corporation, Western Precipitation Corporation is not affiliated, either directly or indirectly, with any other organization in the electrical or mechanical recovery field.

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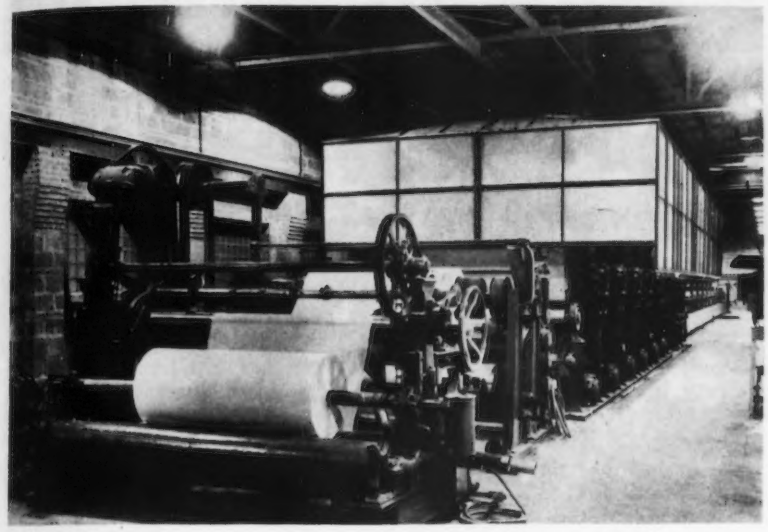
News of the Week



Parchment Machine, KVP Company Ltd., Espanola, Ont., Canada

KVP Produces Vegetable Parchment in Canada

The KVP Co., Ltd., Espanola, Ont., made the first parchment on January 11 and is already producing an excellent grade.

A new building of reinforced concrete, cement block, and brick construction has been built for the parchment operations. It is 55′ x 225′ with full basement. One parchment machine has been installed, with room for a second when needed. The parchment machine was built by Pusey & Jones and will produce a sheet 76″ wide.

The wet end includes all the latest developments in design that 42 years of KVP experience in the manufacture of genuine vegetable parchment have developed.

Conversion and sale of the KVP vegetable parchment is by Appleford Paper Products, Ltd., of Hamilton, Ont., acquired by KVP in 1945, and recently moved into a new and modern plant.

Those in charge of the operations include: E. Norval Hunter, KVP vice-president in charge of Canadian operations; Ben Avery, president, The KVP Co., Ltd.; Don Best, manager of manufacturing; Homer Ralph, superintendent of the new parchment plant; and at Hamilton: George Clark, president, Appleford Paper Products, Ltd.; Colin Glasgow, vice-president and manager of manufacturing; Ron Williams, general sales manager; and Fred Inglis, parchment sales manager.

Increase Florida Railroad Rates

TALLAHASSEE, Fla.—Pulp and paper mills in Florida are among the large intrastate shippers whose costs will go up as a result of a decision by the Florida Railroad and Public Utilities Commission permitting an increase in Florida intrastate railroad rates within 90 days from February 7.

The rate increases will be the same as those granted by the Interstate Commerce Commission on an interstate basis on July 25, 1950. These rate increases on intrastate shipments were not put into effect as ordered by the ICC because of court action instituted by the Florida Railroad and Public Utilities Commission. The commission's appeal was denied in the Florida courts and was appealed to the United States Supreme Court, where it is still pending.

Considering that a decision of the U. S. Supreme Court may not be rendered for some months, the Florida commission, after a hearing, decided to put the rate increases into effect with a proviso that if the high court rules against the increase all of the excess freight charges shall be refunded to shippers.

Among the protestants at the hearing before the Florida Railroad and Public Utilities Commission were the International Paper Co., the Container Corp. of America, the Hudson Pulp & Paper Corp., the National Container Corp. and Rayonier, Inc.

Another New Mill for B. C.

NELSON, B. C.—A $200 million pulp mill will be built here by a new company headed by Walter M. Leutold, pioneer Washington State lumberman.

The newly formed Kootenay Forest Products Ltd. will be connected with operations of Glacier Lumber Co. of Nelson.

Plans announced call for a 200-ton-a-day mill and a forest tract of 400,000 acres, including 40,000 in the Lardeau Valley northeast of here. Employment will be available for 800 to 1000 workers with an additional 600 in the woods operations.

Pulp from Banana Leaves

It is expected that a paper mill will be erected in Teneriffe, Canary Islands, according to Foreign Trade Service, Canadian Government, in a report from Spain.

Kraft-type paper will be manufactured from pulp made from banana trees, report states. The plant capacity will be 6,000 tons per year which will be used to wrap Canary Island exports of bananas and tomatoes. The surplus pulp will be shipped to the Spanish mainland. An annual saving of the equivalent of 36.5 million pesetas in foreign exchange is expected to be realized when the plant gets into production.

New Mill for Mexico

Aarón Sáenz, head of the Mexican Sugar Producers Assn. and the country's leading sugar magnate, announced plans for a newsprint mill to use sugar-cane waste. He indicated that the new mill, costing 30 million pesos ($3,472,000) will have a capacity of 30,000 tons of newsprint a year. Mr. Sáenz said that the pilot plant which has been operating for some time with an annual capacity of 5,000 tons is already producing pulp for Monterrey box factories.

The new plant, to be built at El Mante, in the sugar area, will use bagasse, the cane waste, mixed with a type of reed known as "otate."

Test Compression Evaporator on Sulphite Waste Liquor

WISCONSIN RAPIDS, Wis.—In search of a more practical way to evaporate excess water out of spent sulphite liquor and thus reduce stream pollution, Consolidated Water Power & Paper Co. is testing equipment that was originally designed for making drinking water out of sea water for Navy ships. A pilot plant at Consolidated's mill here is running spent liquor through a sea water still to provide data from which company engineers can determine whether the process will fit pulp manufacturing operations.

All methods which thus far have proved technically capable of concentrating sulphite liquor to burnable density are so costly that there remains some question whether they are economically supportable.

Consolidated's research men are working in cooperation with Cleaver-Brooks Co., Milwaukee manufacturer of sea water stills, to test a vapor compression evaporator. This equipment uses a compressor to reheat the steam from the spent liquor, and is theoretically capable of doing the job at a lower cost than evaporation methods which have previously been employed in paper industry experimentation. After several months of testing, the engineers believe they know the type of equipment required to produce the desired results.

Spent Sulphite Liquor May Make Icy Roads Safe

PARK FALLS, Wis. — In an effort to make sand hold better on icy highways and thus take the worst skids out of winter driving, experimenters here are using spent sulphite liquor to bind the grit to the slippery road surface. If the tests prove successful under typical Wisconsin conditions, the new method would permit sanding long stretches of icy road which now are left dangerously slippery simply because there is no practical way to provide an abrasive surface.

Road sanding is always expensive. The approved mixture of sand and chemicals cost about $3 per cubic yard, and spreading the material costs about $3 more. When the grit merely lies loose on the iced road, wheels of passing cars throw much of it to the shoulder, and most of what remains is lost next time snow must be plowed off. The sheer cost of spreading sand for a few days' usefulness has prevented applying it to many slippery stretches where it would prevent skids.

Trials this winter have been made by wetting glare ice with hot sulphite road binder and following close behind with an application of sand. The sand freezes to the road surface and thus provides a more lasting grit to prevent skids.

The hot sulphite road binder seems to pit the glare ice surface when it strikes. The secret of successful sanding is to have the sand truck with rotary sandslinger following so closely behind the sprinkler truck that the sand hits before the liquid has had a chance to freeze. Sulphite liquor is being used because it comes hot from the mill at no cost.

Price County Highway Commissioner Matt Freeman, is conducting the tests, using road binder provided by The Flambeau Paper Division of The Kansas City Star Co. Engineers of the Sulphite Pulp Manufacturers' Research League have been cooperating with paper mill and road officials because of their interest in reducing sulphite pollution of Wisconsin streams. The Park Falls *Herald* has been fostering the experiments as a step toward safer driving.

The Price County experimenters hope that their method will imbed the sand into the ice surface so that it will last as long as the ice remains. If their efforts succeed, Wisconsin highways could use up a lot of spent sulphite liquor and thus help to reduce sulphite pollution of streams.

Flake and Yarn from Pulp

Processing of pulp into flake and yarn is forecast for the not too far distant future by Harold Blancke, president of the Celanese Corp. of America. During the course of a recent business trip to British Columbia, Mr. Blancke, while at the Watson Island plant of his organization near Prince Rupert, said the company had originally built the plant for export of pulp, but was now planning to take advantage of natural resources encountered in the Prince Rupert area and carry the processing of the pulp as far to completion as was economically possible.

Mr. Blancke said the pulp would be processed into flake and yarn at the new chemical plant of the Canadian Chemical Co., a subsidiary of the Celanese Corp., which is being established at Edmonton. He said that the Prince Rupert plant would, however, be expanded in the future.

Expansion at Port Edwards

Expansion work now underway at the high alpha pulp plant of Columbia Cellulose Co. at Port Edward, B. C., will increase its capacity from 200 to 300 tons. The water treatment plant is being enlarged by the Dominion Construction Co. and new machinery and equipment is being installed.

Engineering details on the existing digesters are being altered and two of the 60-foot vats converted. Work on the remaining vats will be undertaken to ensure continued production.

P and P Paper Export Co.

Pedro G. Celorio and Peter A. Ventura have opened an office at 114 Obrapia in Havana for the importation and sale of paper in Cuba.

Complete Plans for Quesnel Hydro-Electric Plant

Expenditure of $35 million in the development of a new pulp mill and hydro-electric plant in the Quesnel area of British Columbia is now well underway. The pulp mill will cost around $19 million and provide 200 tons of bleached sulphate per day. It will be part of the forest industry development started in 1945 by Western Plywood Co., Ltd.

This company, which has completed a $1,500,000 plywood plant outside Quesnel, is now working out plans for its pulp plant. And, said Premier Byron Johnson, "In the course of the next four or five years this company anticipates a total investment in permanent industry in the Quesnel area amounting to $20 million."

Building of the pulp mill will require power, and it is now understood that plans are completed for the long-delayed hydro-electric installation by the B. C. Power Commission in this area.

Plans now call for the power plant on the north fork of the Quesnel River, which is not expected to be fought by salmon interests as vigorously as other sites have been.

The installation will run to 150,000 horsepower, or approximately the size of the John Hart hydro development on Vancouver Island when it is finished.

This will be built in two stages, with the first stage, including dams and other features, costing about ten million dollars.

Yanklowitz Buys United Wallpaper

Yanklowitz Paper Co. has recently purchased the former United Wallpaper plant at Hudson Falls. The plant will be for waste paper processing.

Cement Bag Plant for Nesher

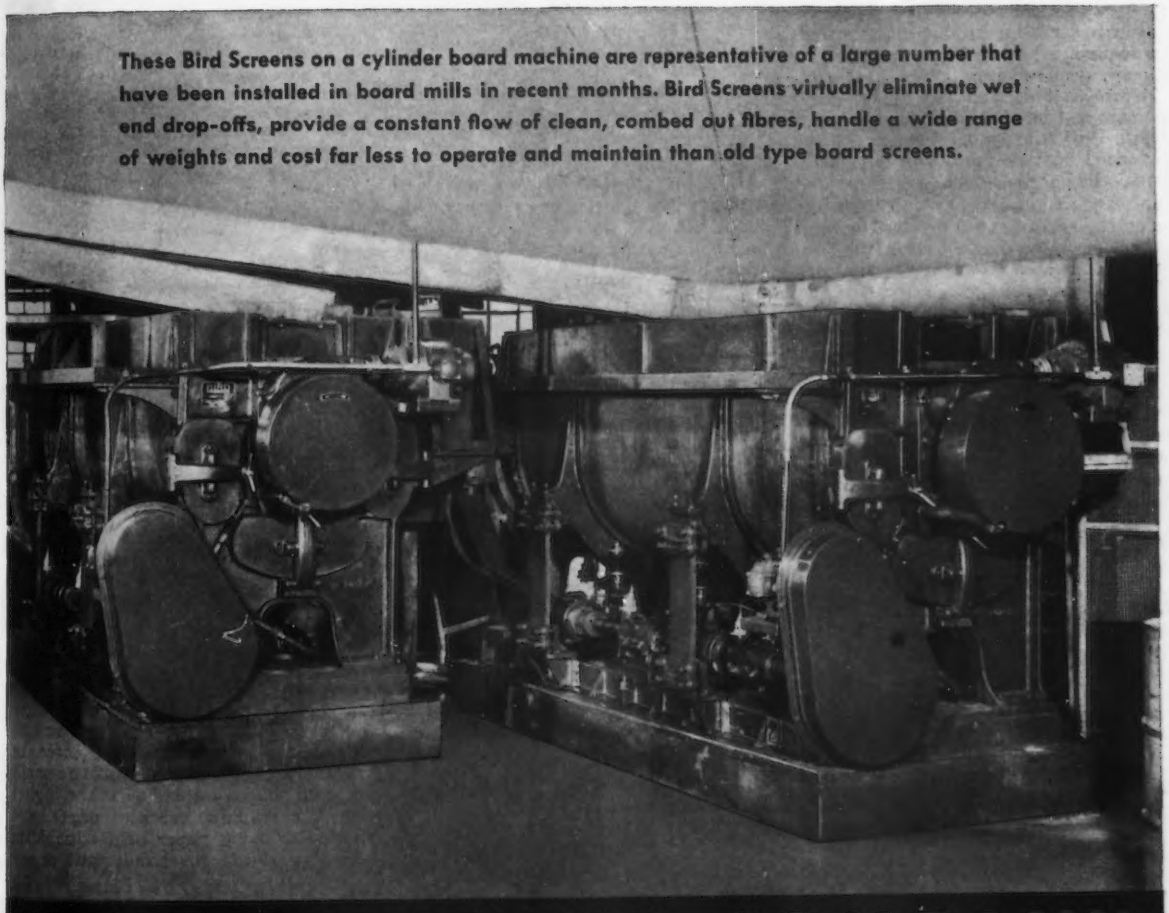
A factory for the manufacture of cement bags, to start production by next spring, is being built at Nesher by the Palestine Portland Cement Co. Ltd., at a cost of I£250,000 and financed jointly by the Nesher company and a Finnish firm which will supply the paper and the machines. Initial output is expected to be 20 million paper bags per year, saving 30 percent of present outlay of foreign currency for sacks.

Gair to Double Capacity at Toronto

Gair Co. of Canada plans to double the capacity for making corrugated shipping containers with a new $700,000 extension to its Containers Division plant in Toronto. The estimated cost includes plant as well as equipment. It is expected to be ready for occupancy late next summer.

100,000,000
POUNDS OF PAPER PER DAY
are screened by
BIRD SCREENS

in order to assure continuous production of uniformly clean, well formed paper at maximum machine speed



These Bird Screens on a cylinder board machine are representative of a large number that have been installed in board mills in recent months. Bird Screens virtually eliminate wet end drop-offs, provide a constant flow of clean, combed out fibres, handle a wide range of weights and cost far less to operate and maintain than old type board screens.

BIRD MACHINE COMPANY
SOUTH WALPOLE • MASSACHUSETTS

EUROPEAN SPOTLIGHT

At the end of 1951 and in January 1952, the European paper-market had a rather chaotic character. Business declined and generally speaking, demand for paper grew less. From various countries we received reports speaking about unsufficient demand in the home market, but most producers were able to sell their surplus production abroad and overseas. The unstable tendences of the paper market were illustrated by the situation in the Scandinavian countries, especially in Sweden and Finland. Both countries prefer to export their paper and to hold their pulpwood and woodpulp available for the home industry. This caused the queer effect that in some cases, prices of woodpulp were considerably higher than the prices of the paper, manufactured from the same woodpulp. The diminishing demand, combined with the hope of getting greater quantities of woodpulp from the Scandinavian countries this year, resulted in a more easy, though very unstable market, from which it is rather difficult to give a definite report.

In *France,* a top production was realized during the third quarter of 1951, though demand was falling back considerably. This fall-back in demand is not restricted to France; it is a feature of the paper market to be observed in several European countries. Paper prices have become too high and begin now to endanger the sales of books, magazines and several other paper-products. Also the unstable market and other chaotic conditions, such as prices for import-papers being often below prices for the home-product, were other reasons for the buyers to wait and see. Much interest is shown here in new projects for converting tropical woods and grasses from French Africa into paper, though the French trade-press is not very enthusiastic. Transport problems, lack of labor, etc., are serious difficulties which have, up till now, put a stop to many of the good-looking projects of this nature.

From the western zones of *Germany* we continue to receive reports about increases of production of paper and board. Production now amounts to about 165.000 metric tons a month. The woodpulp production is at 50.000 tons monthly. Exports of paper and board were about 6500 metric tons in the third quarter, against nearly 8000 tons in the first quarter of 1951. This sharp drop, which may continue during the first half of 1952, may be a result of the general fall-back of demand in most European countries.

In *England,* the re-introduction of import-licenses tends to create again a period of shortage in the paper market, but the British trade press thinks this shortage will be less serious as high prices and money shortage are creating a considerable sales resistance by the general public.

In *Sweden* there was little activity to report at the end of 1951 and during the first month of 1952. Prices for delivery in the first quarter seem to be at about the same level as for the fourth quarter of 1951. A diminishing of prices, though not impossible and much discussed in the European trade-press, is not yet heard of.

Denmark reports about new controls on the import of paper, which measure is taken because of the weak position of the Danish valuta abroad. The high prices of wood pulp induced Danish papermills to restrict their production to 90 percent of capacity.

It is known, that the trade-union of workers in the paper and woodpulp industries of *Norway* wish to nationalize their paper industry. During their annual meeting, the trade-union discussed this project again, but leading persons in the paper industry don't think this project will meet with any success. Up till now, the government has not been willing to support the idea.

The paper industry of *Spain* is a highly concentrated industry, consisting of 64 companies, among which Papelera Espanola at Bilbao is the most important one. Annual production is now about 170.000 tons, of which 86.000 tons are printing paper, 17.000 tons newsprint and 25.000 tons wrapping paper. All figures in metric tons.

In *Finland* a new newsprint mill will be built by Enso-Gutzeit. The mill has a site at the river Vuoksen. Annual production will be about 100.000 metric tons. The paper machine will be the biggest of Europe and will be bought in the U.S.A. Payment has been made possible by the loan, granted by the International Bank to the Finnish Wood Industry.

A.P.W.

ONLIWON

INDUSTRIAL
TOWELS
TISSUE

Irish Imports

In November, 1951, the Republic of Ireland imported paper and cardboard, etc., to a total value of £822,707 as against £447,834 in November, 1950. These imports brought the total value to £7,617,522 for the first eleven months of 1951, as against £4,402,842 in the corresponding period of 1950.

Of the November, 1951 imports paper-making materials amounted to 959 tons, valued at £90,855 against 2,090 tons valued at £90,869 in November, 1950.

Coated printing paper, amounting to 3,758 cwt., and valued at £28,524 was imported in November, 1951 against 2,231 cwt., valued at £10,721 in November, 1950.

Newsprint imports were 62,630 cwt., valued at £196,597 in November, 1951, against 39,714 cwt., valued at £72,853 in November, 1950.

Other uncoated printing paper imported in November, 1951 amounted to 5,596 cwt., valued at £41,893 compared with 1,586 cwt., valued at £7,203 in November, 1950.

Other import values, included in the *Trade Statistics* issued by the Central Statistics Office in Dublin are:-

Article	Nov. 1951	Nov. 1950
Writing paper in large sheets .	£21,103	£5,390
Packing and wrapping paper ..	£3,567	£3,971
Tissue paper	£8,716	£5,387
Oiled, waxed and other waterproof paper	£22,433	£16,527
Cigarette paper	£7,568	£12,034
Greaseproof paper	£8,757	£4,335
Imitation parchment	£22,859	£8,248
Gummed paper	£6,583	£6,230
Printed wall and ceiling paper	£2,368	£2,986
Transparent cellulose, etc., wrapping paper (in sheets and rolls)	£24,972	£13,496
Other paper	£17,392	£12,375
Empty cardboard containers and parts	£48,613	£33,641
Fillers and flats for egg boxes	£1,631	£6
Strawboard, not worked or corrugated	£21,160	£8,125

Customs Court Cases

Knockdown boxes imported from Japan at San Francisco and from Canada at Detroit are under study by Customs officials, according to Warren B. Bullock, Manager of the Import Committee of the American Paper Industry, the issue being whether they are dutiable as manufactures of paper, or at a higher rate for boxes of coated paper. The boxes are of vat-lined paperboard.

The January docket of the United States Customs Court at New York included one protest by an importer of candy wrappers held for duty as articles of waxed paper, one of filter claimed to be dutiable at the lower rate for paper cut into shapes, three of napkins claimed to be dutiable as paper cut into shapes instead of at the higher rate for manufacturers of paper, and one of drawing paper held dutiable at the higher rate for hand made paper.

Five shipments of Finnish kraft wrapping paper are before the United States Customs Court at New York in protest against a Customs finding that the paper was undervalued, and twenty-eight similar protests on such paper are before the same court in Philadelphia.

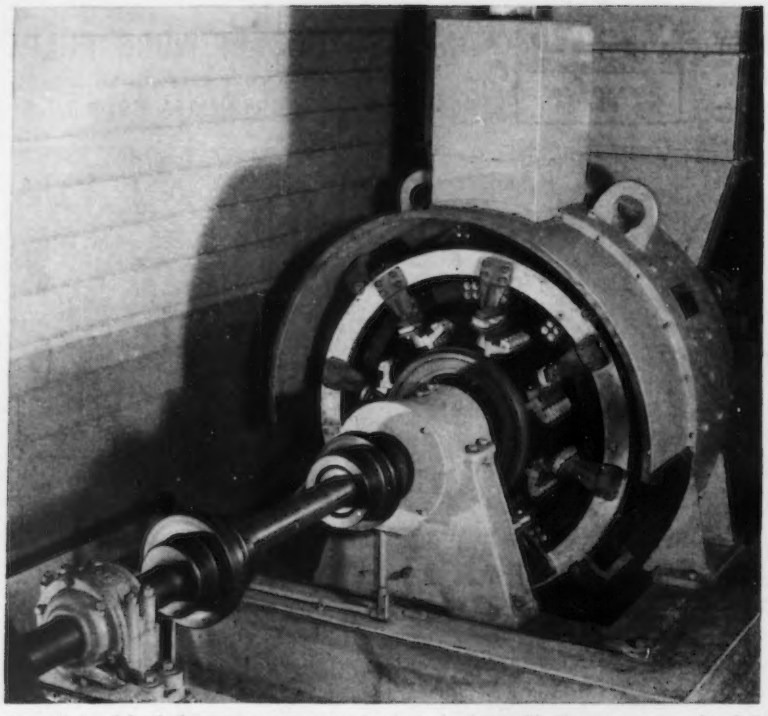
THE MEAD SALES COMPANY
230 PARK AVENUE, NEW YORK 17, N. Y.
20 NORTH WACKER DRIVE, CHICAGO 6, ILL.

MEAD
pulp

DISTRIBUTORS OF WOOD PULP
BLEACHED AND UNBLEACHED
CHEMICAL AND MECHANICAL WOOD PULP

A ketchup tank wagon broke a wheel on one of Paul Bunyan's footprints and was wrecked. The resulting stream continues to flow as the Red River of the North.

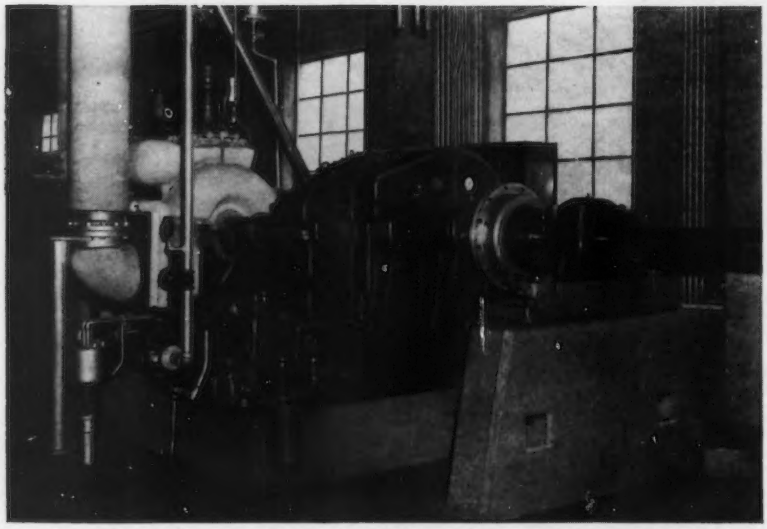
A reproduction of this incident from the fabulous life of Paul Bunyan—the sixty-second of a series—will be sent on request. It will contain no advertising.



Regardless of load changes, any pre-set speed can be kept with pinpoint accuracy by G-E single-motor drives for lineshaft-driven machines. Simple, flexible operation—with speed ranges up to 10:1 or higher—helps maintain uniform weight and quality of the sheet. At the Camas, Wash., paper mill of the Crown-Zellerbach Corp., this G-E main drive motor for the No. 15 paper machine is rated 900 hp, 600 rpm, 600 volts.

Supplying power to motor at left is this G-E main motor-generator set, including 750-kw d-c generator, 1250-hp synchronous motor, 150-kw auxiliary generator, and 25-kw d-c exciter. All are mounted on a common base for easy installation.

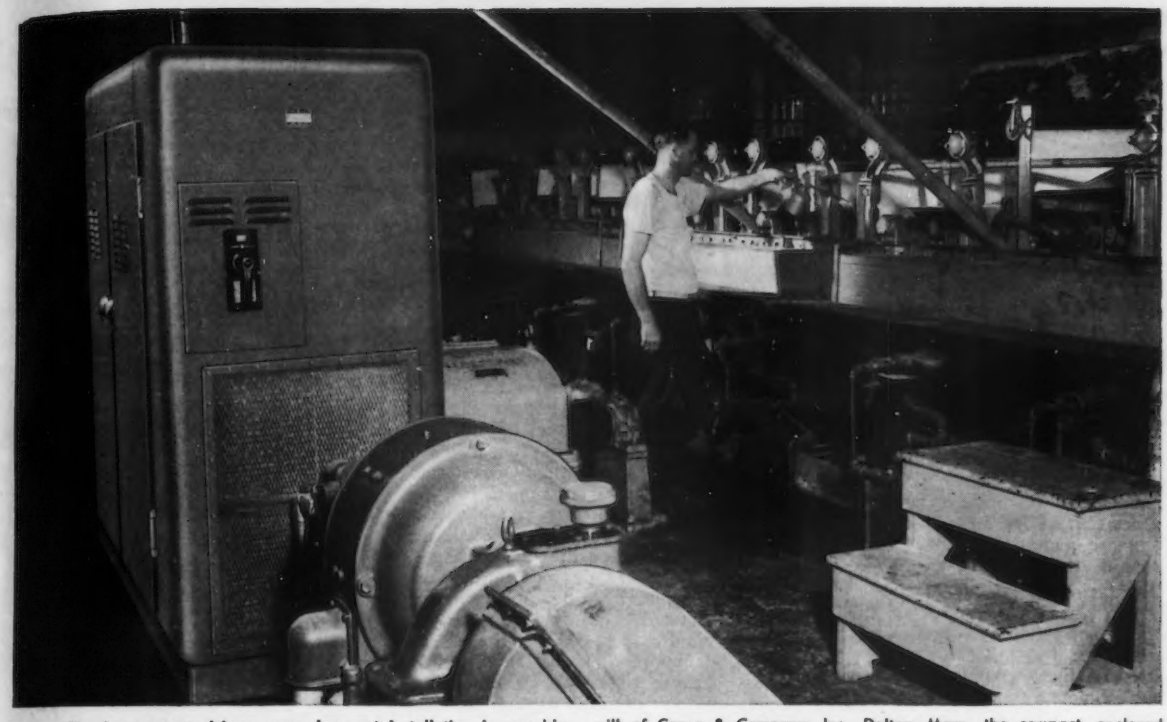
Get more paper from your



Reliably, safely, at low cost—G-E mechanical drive-turbines can provide your lineshaft machine with mechanical power as a by-product of your process steam. Adjustable speed with ranges up to 10:1 or higher are provided with great accuracy by their governors. At the Lewiston, Idaho, paper mill of Potlatch Forests, Inc., one of these G-E units—rated 1750 hp, 7000/450 rpm—is shown driving a paper-machine lineshaft.

CO-ORDINATED PAPER-MILL DRIVES

NEW! G-E Motor Selection and Application Course—timed to meet today's needs—can help train your paper-mill employees, increase their efficiency. A G-E "More Power to America" program, it shows how motors work, types now in use, how to select and apply them for specific jobs. Bulletin GEA-4938-16 describes the course in full. ***Write for it!***



For smaller horsepower drives, easy low-cost installation is one big reason why more and more paper-mill operators are using the G-E Speed Variator single-motor drive. An adjustable-voltage d-c drive operating from a-c power, it includes a packaged power unit that's easy to install, maintain, and re-locate if necessary. At the Bay State paper mill of Crane & Company, Inc., Dalton, Mass., the compact, enclosed Speed Variator power unit—shown here behind its G-E 40-hp d-c motor on a lineshaft-driven paper-making machine—"makes for smoother operation all the way through," say company engineers.

lineshaft-driven machines!

One of these General Electric drives—correctly engineered to your needs—can bring out the best in your lineshaft-driven machines, increase your output of uniform-quality paper!

Which drive will do the most for *your* lineshaft-driven paper machines—in raising output to your paper machine's top capacity, maintaining a uniform high-quality sheet, and keeping your paper-making costs down?

It's a problem that can't be solved the same way every time. That's why General Electric offers paper-mill operators a choice of lineshaft drives shown on these pages. With this variety—and with an experienced G-E paper-industry engineering specialist helping in your selection and application problems every step of the way—you're sure of an answer that's *right for you.*

It may call for holding desired speed with great accuracy, either with a G-E single-motor drive or with an efficient G-E mechanical drive turbine to generate mechanical power and supply process steam. In either case, you'll get the right combination of speed-control and sensitivity, the speed range desired, and a drive that's easier to operate, provides top reliability, and requires less maintenance.

To get more paper from your lineshaft-driven machines, get in touch with your G-E paper-mill specialist—now!—at your nearest G-E office. Meanwhile, send for these bulletins: GEA-5288—"Single-Motor Drives," GEA-5580—"New Multi-stage Turbine Drives," GEA-4955A—"Type DP Turbines." ***General Electric Company, Schenectady 5, N. Y.***

GENERAL ELECTRIC

655-10

GOVERNMENT GOSPEL

Mexico's Industry Asks Waste Paper Control

Representatives of workers in Mexico's paper industry have appeared before officials of the Department of National Economy to ask for controls on waste paper imports, as well as regulations establishing price ceilings for this product.

Presiding at the joint session covering diverse matters of interest to the paper trade was Secretary of National Economy Antonio Martinez Báez; Julian Rodriguez Adame, managing director of the government price control agency; Francisco Argüello, president of the Paper Committee as well as representatives of the National Chamber of Manufacturing Industry, Association of Industrial Chambers of Commerce and the Society of the Graphic Arts Industry in Mexico.

Indalecio Celorio Ortega, representing the National Chamber of the Paper Industry gave a resumé of the work done by an investigating committee of the organization. Main accomplishment was that by recommendation of the committee only paper strictly necessary for the graphic arts and other paper users has been permitted to enter the country. This rule, effective since September 24 of last year, is said to have aided the national industry materially. Now officially, all paper imports are subject to control and the issuance of special permits. Waste paper had not been covered under this provision and the industry seeks to close up this loophole.

Báez has taken the matter under advisement, and also announced that a coordinated effort will be inaugurated between officials and paper industry representatives to assure improved conditions and progress for all branches of the paper trade in Mexico.

Recommend Government Suspend Inventories Consumption Controls

WASHINGTON, D. C. — Wood pulp producers' spokesmen this week recommended a suspension of government controls on inventories consumption and reserve production of unbleached kraft wood pulp until July 1, 1952.

The recommendations, by the industry advisory committee for wood pulp producers, were:

Suspension of NPA Order M-72 (chemical wood pulp) until July 1, as far as unbleached sulphate is concerned, but that export restrictions be retained as may be necessary;

Continuation of controls on paper grades of white pulps, including unbleached sulphite, under M-72;

NPA has agreed to take up the recommendations with other industry advisory committees involved.

The recommendations followed a report by NPA that availability of certain wood pulps has improved; the 3 percent reserve production of all types of wood pulps as required in M-72, was 82,034 tons on December 1, 1951, of which 51,113 tons were sold, with the balance either unsold, or going into replacement of market purchases.

Bleached pulps are still in short supply, it was reported.

Increase Woodpulp Export Quota

WASHINGTON, D. C.—A supplementary 25,000 ton increase in the first quarter 1952 export quota for woodpulp was announced by the Office of International Trade this week.

The increase covers unbleached sulfate wood pulp, and is in addition to 25,000 tons of the same type already made available for the quarter.

OIT said the doubled quota was made possible by a temporary easing in domestic demand for the grades of unbleached sulfate wood pulp covered by the export quotas. It was added that because of the large number of pending export applications, the supplementary quota will be exhausted in a short time.

The 50,000 ton quota for the first three months of this year compares with 30,000 tons in the fourth quarter 1951 allotment for export.

Blotting and Impregnating Papers Regulation

Recommendations that a tailored regulation be prepared for their segment of the paper industry were made by members of the Blotting and Impregnating Paper Industry Advisory Committee at their first meeting with OPS officials.

Committeemen suggested that dollars-and-cents ceilings be spelled out for standard grades of blotting paper, and that formula pricing be provided to cover impregnating and saturating papers which are treated with plastics and other chemicals to make special papers for decorative and industrial uses.

Tax Amortization Paper Priority

The DPA reports that the current list of priorities for processing applications for certificates of necessity for rapid tax amortization has been expanded to include pulp, paper (including newsprint) and paperboard.

The decision to include this new category in the priorities list was unanimously approved at a meeting of the Deputy Administrators of DPA.

Placing this new category on the priority list will put these commodities in a position where applications for tax amortization covering expanded production facilities will be processed in due course along with other categories now on the list. It has been stressed that numerical position on the priorities list has no significance since all categories receive equal preferential treatment.

Expansion goals for a number of pulp and paper products are now under consideration by DPA's Office of Program and Requirements, DPA said. Since newsprint goals have already been determined, newsprint facility applications will receive early consideration.

Welfare Plan

The Wage Stabilization Board ruled that in certain circumstances employers and employes may place their health and welfare contributions in a temporary escrow fund pending Board action on the schedule of benefits to be financed by the contributions.

General Wage Regulation 19 and Resolution 78, adopted by the WSB last month, deal with health and welfare plans on the basis of the benefits rather than on a cost basis.

The Regulation and Resolution establish certain criteria under which health and welfare plans can be put into effect automatically 30 days after the plan is reported to the Board on a prescribed form, unless the filing party is notified to the contrary.

If the terms of the proposed plan or of the modification of an old plan vary from the definitions of Regulation 19 or contain any of the features listed in the Resolution 78, such plans will be submitted to a newly-established, tripartite health and welfare committee for action.

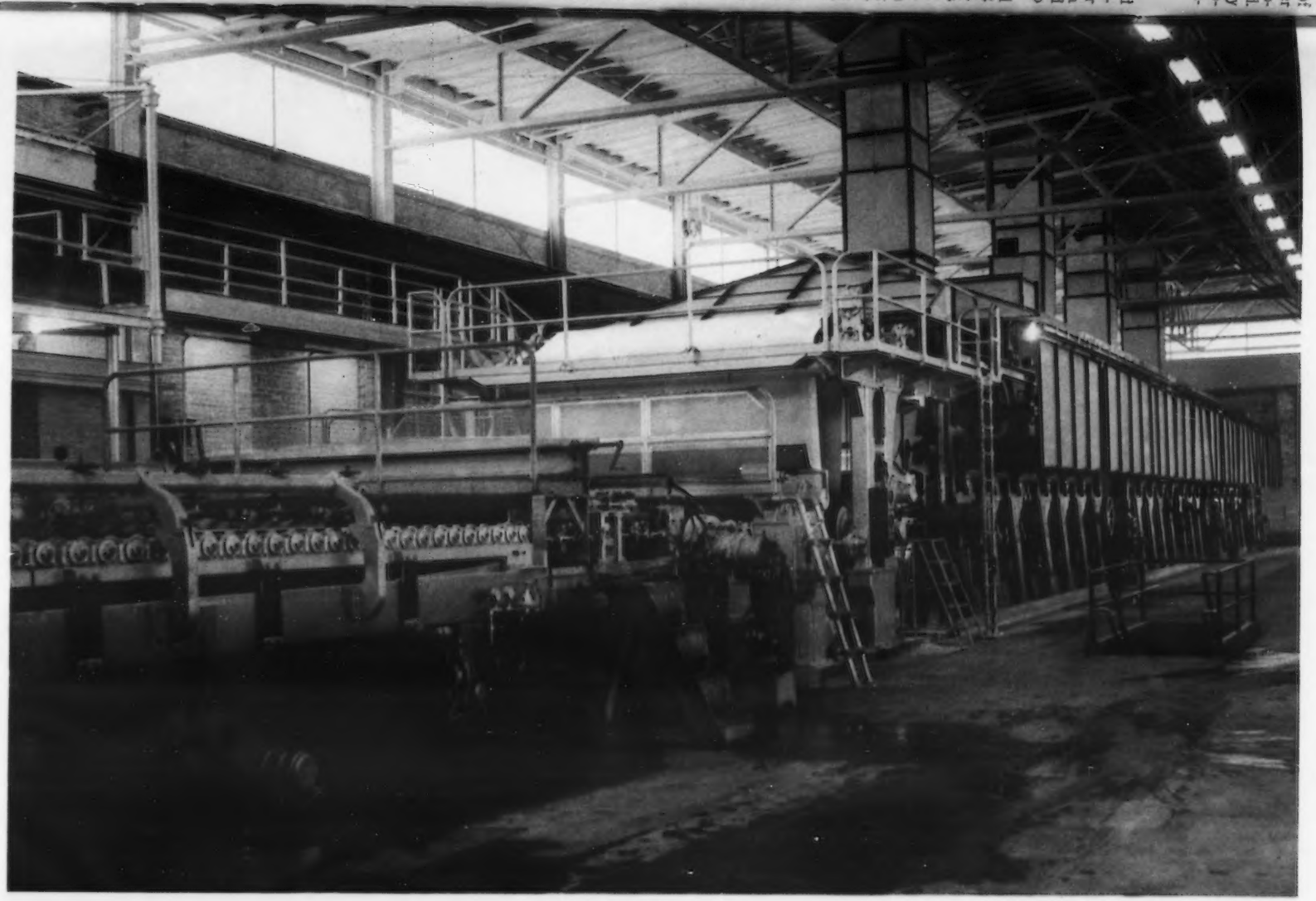
Some employers and employes agree, however, on a fixed contribution to a fund for health and welfare benefits — so many cents per hour, a certain percentage of payroll, etc. — and leave the benefits to be financed from the fund to be worked out later.

Under Regulation 19 and Resolution 78, the WSB cannot act on a welfare plan geared to costs and must wait until the parties submit the schedule of benefits.

The action of the Board authorizes the parties to start making their contributions to the health and welfare fund immediately and place the money in a temporary escrow fund until the benefits have been spelled out and reported to the WSB for action.

Forest Service Launches Review of Timber Resources

A review of the timber resources of the United States is being launched by the Forest Service. The review, said Lyle F. Watts, Forest Service chief, which will take at least two years to complete, will bring up to date the information on timber resources, reanalyze prospective requirements, supplies, and growth of timber, appraise today's timber-conservation programs, and chart a course for American forestry. Advice in planning the project and help in determining the facts of the forest situation will be sought from State and private forestry agencies, the wood industry, and conservation organizations.



COLOR PHOTOGRAPH BY JOHN G. MOLYOKE

LEE PAPER COMPANY, Vicksburg, Michigan, recently started up its new 130″ Beloit machine for the manufacture of high-grade rag-content bond and other fine papers. The first machine for production of this type to be installed in the U. S. in more than 20 years, it is already setting new standards for speed and quality. It was built by Beloit Iron Works at Beloit, Wisconsin.

Tentative Program for Annual Meeting of American Pulpwood Assn.

February 19

Session: JOINT MEETING OF TECHNICAL COMMITTEES

Place: Empire Room, Lexington Hotel, New York City
Time: Registration—8:30 a.m.

Morning Program (9 a.m. to 12 noon)

Business Session
Luncheon: 12:00 noon to 1:15 p.m.
Luncheon Speech: "Training and Safety Programs in Industry"—by J. G. Schoener, New York Telephone Company—Discussion.

Afternoon Program (2:15 p.m. to 5:00 p.m.)

1. Time and Cost Studies of Pulpwood Logging
   G. M. Wilson — Johns-Manville Products Corporation, New York City (formerly from Jarrat, Virginia)
2. Use of International Business Machine, Remington Rand and McBee Cards in Timber Cruising and Pulpwood Scaling.
   A. "Continuous Forest Inventory with I.B.M. Mark Sensing"—C. B. Stott, Forester — U. S. Forest Service, Milwaukee.
   B. "Use of I.B.M. Cards in Pulpwood Scaling"—R. G. Belcher, Interntaional Paper Company.
   C. "Use of McBee Cards in Forest Inventory Work."
   D. Comments by representatives of:
   International Business Machines Company
   Remington Rand Company
   McBee Keysort Company
3. Application of Radio to Pulpwood Production and Procurement
   By a representative of Camp Manufacturing Company, Franklin, Va.

February 20

Session: ANNUAL OPEN MEETING FOR MEMBERS AND GUESTS

Place: Astor Gallery, The Waldorf-Astoria, New York City
Time: Registration—8:30 a.m.
In Session—9:30 a.m. to 5:00 p.m.
Morning Program 9:30 a.m. to 12:00)
Welcome by President of Association: J. E. McCaffrey, International Paper Company, Georgetown, S. C.

1. Research and Pulpwood Production
   Dr. Lincoln R. Thiesmeyer—President, Pulp & Paper Research Institute of Canada.
2. Recent Developments in Portable Debarkers
   E. W. Fobes—U. S. Forest Products Laboratory, Madison, Wisc.
3. Research in Chemical Debarking—A Symposium
   (Presented by panel of research workers in this field who will each state general status of studies and plans, and then carry on discussion within panel and finally to the floor)
   Moderator—M. H. Collet, Chairman, Chemical Debarking Research Project
   Dr. H. W. Popp—Pennsylvania State College
   Dr. A. J. Panshin — Michigan State College
   R. G. DeMoisy—Forest Products Research Institute
   A. L. Bennett—Armstrong Forest Company.
   J. D. Hale — Canadian Forest Products Laboratory
   H. R. Palmquist—Marathon Corporation
   Dr. Hugh Wilcox — New York State College of Forestry
   F. Czabator — New York State College of Forestry
   D. J. Wort—University of British Columbia

Afternoon Program (2:00 p.m. to 5:00 p.m.)

1. Tree Length Skidding of Pulpwood
   George Carr — Pacific Car and Foundry Company, Franklin Park, Ill.
2. Pulpwood Timber Sale Policies on National Forests
   Moderator—G. L. Drake, Vice-President, Simpson Logging Company, Shelton, Washington
   Forest Service Members—
   Washington Office—I. J. Mason, Chief, Division of Timber Management
   Southeastern Region Representative—William H. Fischer
   Northeastern Region Representatives—M. A. Mattoon, C. L. Graham
   Lake States Region Representatives — H. E. Ochsner, C. B. Stott
   Pulpwood Industry Members—
   W. J. Damtoft—Champion Paper & Fibre Co., Canton, N. C.
   E. F. O'Hara—Armstrong Forest Company, Johnsonburg, Pa.
   C. S. Herr — Brown Company, Berlin, New Hampshire
   Earl Porter—International Paper Company, Mobile, Alabama
   G. L. Snowden—The Mead Corporation, Chillicothe, Ohio
   E. B. Hurst—Consolidated Water Power & Paper Company, Wisconsin Rapids, Wisconsin
3. Federal Government Mobilization Agency Roundup (Summary reports from personnel of agencies concerned)

Evening Program

Annual Informal Dinner for Members and Guests
Room: Astor Gallery
Time: Cocktails at 6:45 p.m.—Dinner at 7:30 p.m.
Entertainment
No Speeches

February 21

9:30 a.m.—Members Meeting
2:30 p.m.—Directors Meeting

Leon Henderson to Speak

The Tissue Assn. announces that the principal speaker at its annual meeting on February 19 will be Leon Henderson, well known throughout the country as the first head of the OPA during World War II. Mr. Henderson's subject will be "Congress Looks at the Almanac."

Mr. Henderson is now an economic consultant for business concerns, for law firms on legal cases, on excise and excess profit taxes representing business committees and he is also Director of Research for the Jewelry Research Foundation and consulting economist for the Research Institute of America, all of which bring him into close touch with today's business currents and taken together with his background make Mr. Henderson peculiarly well fitted to discuss the problems which have the greatest impact on business today.

Supts' Southern Meeting Dates

Southern and Southeastern Divisions of The American Pulp and Paper Mill Superintendents Assn. are to meet in joint session for their 1952 fall meeting on October 8-10 at Hotel Roanoke, Roanoke, Va.

Cecil B. Curry, National Container Corp. of Virginia, Big Island, Va., is chairman of the Southeastern Division; J. J. Thompson, Southland Paper Mills, Inc., Lufkin, Texas, of the Southern Division.

Strengthening Eucalypt Groundwood by Alkalis, and Bleaching with Hypochlorites*

F. R. Neale, A. J. Pearson, and J. L. Somerville

Senior Research Chemist, Research Chemist, and Chief Chemist respectively, Australian Newsprint Mills Ltd.

Summary

When alkalis were reacted with groundwood, substances were dissolved from the pulp, the strength was increased, and the bulk and the freeness of the pulp were decreased. Alkalis, examined in chemically equivalent amounts, were placed in the following order of effectiveness for increasing the strength of pulps: — sodium and potassium hydroxides equal, then calcium hydroxide, sodium carbonate, and ammonium hydroxide. Sodium hydroxide increased the brightness of the groundwood, but calcium hydroxide caused serious decreases in brightness. Considerable amounts of sodium hydroxide remained unconsumed after treatment with the larger charges. The surplus could be reduced to a minimum by extracting with sodium hydorxide in two or more countercurrent steps.

The conditions adopted for extracting the groundwood with 3.0 percent of sodium hydroxide were a temperature of 50°C., a stock concentration of 3.0 percent and a time of three hours. With these conditions, 10.0 percent of sodium hydroxide removed 12 percent of the dry weight of the groundwood, doubled the tear factor, and trebled the burst factor.

Sodium hydroxide removed two groups of substances from the groundwood. Removal of the first group, including the strongly colored substances was associated with only small increases in strength. Removal of the second group, probably including hemicellulose, was associated with much larger increases in strength.

The untreated groundwood was found to be bleachable by sodium and calcium hypochlorites, but only to a small degree. Removal by sodium hydroxide of alkali-soluble coloring matter greatly improved the response of the groundwood to bleaching.

It was necessary to use a large excess of alkali to maintain the pH at a value greater than 11 when bleaching the untreated groundwood. When bleaching groundwood that had been extracted with sodium hydroxide, maximum increase in brightness was obtained at lower pH values, requiring only about 0.5 percent charges of excess alkali.

Strength and brightness were increased simultaneously by bleaching alkali-extracted groundwood in the presence of a large excess of base, but some loss of brightness resulted. This loss could be offset by increasing the proportion of bleach used.

Introduction

Eucalypt groundwood may be brightened by washing with acid and extracting coloring matter with sodium hydroxide *(1)*, or by treatment with zinc hydrosulphite at appropriate pH values *(2)*. These two methods give only moderate increases in brightness. Treatment with sodium hydroxide gives, in addition, a significant increase in strength. The present paper describes studies of this strengthening effect of alkali on eucalypt groundwood, of the bleaching with hypochlorite and of a combination of the two.

Curran, Schafer, and Pew *(3)* found that sodium hypochlorite was quite effective in bleaching groundwood made from the heartwood of western hemlock. Calcium hypochlorite, however, did not bleach groundwood made from the sapwood so well. They concluded that the poor result with the calcium salt was due to a reaction with coloring matter in the pulp. The effectiveness of both sodium and calcium hypochlorites was increased by the addition of sodium hydroxide. Craig *(4)* described a process for bleaching poplar groundwood contaminated with rot, using calcium hypochlorite with the addition of sufficient sodium hydroxide to maintain the pH at 10.5. After bleaching, he added sulphur dioxide to acidify the pulp to a pH value between 5.0 and 5.5 Brallier and Nowicke *(5)* described a process for bleaching groundwood, using calcium hypochlorite with the addition of 2.0 percent of sodium hydroxide and 6 percent of sodium silicate to maintain the pH at 10.5. Kingsbury, Lewis, and Simmonds *(6,7)* showed that groundwood pulps from North American hardwoods were bleached more effectively by hypochlorites than were groundwood pulps made from softwoods. They obtained maximum brightness by bleaching at relatively low stock concentrations in the presence of excess base, with an initial value for the pH of 11 to 12 and a final pH value of not less than 8. Control of the alkalinity required the addition of from 3 to 6 percent of calcium hydroxide. Brightness increases obtained by treatment of hardwood pulps with 10 percent of available chlorine ranged from 18 to 24 units *(6)*, and later *(7)* from 8 to 23 units. In some instances somewhat higher brightness increments were obtained with sodium hypochlorite than with calcium hypochlorite. Important increases in strength and decreases in Canadian standard freeness (C.s.f.) were obtained with some pulps. Kingsbury *et al.* extracted post oak groundwood with 2.0 percent of sodium hydroxide to remove tannins and thereby increased its response to bleaching by either hypochlorite or hydrogen peroxide.

Mackney *(8)* followed the changes in composition of mature *E. regnans* wood caused by extracting it with various charges and concentrations of sodium hydroxide. The slope of a straight line fitted to his data corresponded to a loss of approximately 1.3 percent of substance for each 1.0 percent of sodium hydroxide consumed. He found, as had been observed previously, that the smaller charges of sodium hydroxide (1.25 to 5.0 percent), at concentrations of 0.08 percent and less, removed non-lignin substances which inflated the Klason lignin value. Some of the less resistant lignin was also removed when the sodium hydroxide concentration was

* Presented at the 4th General Conference of the Australian Pulp & Paper Industry Technical Assn. in Melbourne.

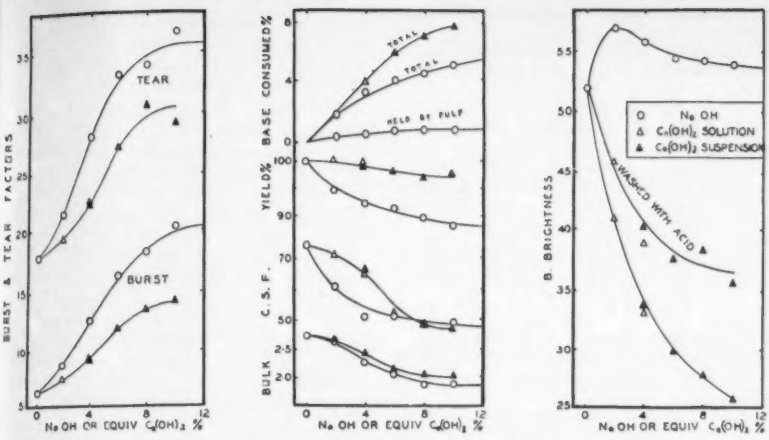


Figure 1.—Changes in the properties of groundwood caused by treatment with sodium and calcium hydroxides

raised to 0.16 percent (equivalent to 3.2 percent stock concentration with a 5.0 percent charge). As the amount of substances removed from the wood increased, the uronic acid content and furfural yield decreased. A considerable part of the observed decrease in furfural yield could be due to loss of uronic acid. Alkali extraction also modified part of the carbohydrate fraction (that bearing neither carboxyl nor methoxyl), making it sensitive to oxidation in the analytical procedure for determining permanganate number, and soluble in the reagents used for isolating holocellulose.

Experimental Methods

The groundwood pulps used for the preliminary experiments were prepared in the laboratory, but in later experiments the majority were taken from industrial production. Except where specifically stated, all chemical treatments were performed at 3.0 percent stock concentration and at the temperature of the laboratory (i. e., about 20°C.), and pulps were washed thoroughly with distilled water before treatment and after each step. Charges of chemicals used are expressed as percentages of the moisture-free fibre present. Pulps were acidified to pH 5 with sulphuric acid before they were evaluated for strength or brightness. Determinations of pH were made with a glass electrode pH meter. The pulps were evaluated by P.M.A. standard methods *(9)*.

For the determination of brightness, three handsheets were prepared in the manner described previously *(2)*. Two scales of brightness were used to assess degrees of bleaching. On both scales, brightness was expressed as a percentage of that of magnesium oxide. In the earlier stages of the work the photoelectric cell used incorporated a "Viscor" filter to adjust the relative spectral sensitivity of the photoelectric cell to approximately that of the human eye (manufacturer's claim). Brightness values on this scale are designated "Y' brightness." In later work, a Wratten No. 49 filter was used to give an effective wavelength of about 457 millimicrons for the brightness measurement. Values on this scale are designated "B brightness."

The excess sodium hydroxide remaining in the filtrate after the alkali extractions was determined by titration, with sulphuric acid, of an aliquot equivalent to about 7 g. of moisture-free pulp. The color of the extracts obtained from treatment of groundwood with sodium hydroxide was so dark that indicators could not be used without considerable uncertainty in the end point. The changes in pH were followed with a glass electrode pH meter. The titration curves had clearly recognizable inflexions between pH values of about 7.8 and 8.6 and a pH value of 8.3 was selected as the end point. The extracts obtained by the use of calcium hydroxide were quite light in color. Free calcium hydroxide was determined by titration with acid to an end point with phenolphthalein. After the extracts had been filtered from the groundwood they continued to consume excess sodium and calcium hydroxides. For example, in one experiment groundwood was extracted with sodium hydroxide equivalent to 6.0 percent of the moisture-free weight of pulp used. One hour after being separated from the pulp, the extract contained free sodium hydroxide equivalent to 2.15 percent of the moisture-free pulp. The amount of sodium hydroxide found next day was 2.05 percent and over a period of weeks the amount present decreased progressively to the equivalent of less than 1.0 percent. In order to avoid errors from this cause, sodium hydroxide was determined in the liquors within a few hours of their being filtered from the pulps.

To determine the yield, duplicate or triplicate samples were taken from the treated pulp. The solids were quantitatively separated on a 200-mesh wire cloth and dried at 105°C. Untreated groundwood was sampled in a similar manner and the yield of treated groundwood was calculated as a percent of the untreated groundwood.

TABLE I

CHANGES IN THE PROPERTIES OF GROUNDWOOD CAUSED BY EXTRACTION WITH SODIUM HYDROXIDE AND CALCIUM HYDROXIDE

Extraction Treatment			Total Base	Pulp Properties							
First	Second		Consumed as							Drainage	B
NaOH	NaOH	Ca $(OH)_2$	NaOH	Yield		Burst	Tear			Time *	Brightness
%	%	%	%	%	Bulk	Factor	Factor	C.s.f.		sec.	Change
nil	nil	nil	nil	100	2.78	5.7	17.8	81		8.2	nil
6	nil	nil	4.1	90.6	2.03	16.3	32.5	53		21.4	+2.3
2	4	nil	4.1	90.1	2.01	17.0	32.0	52		23.2	+1.8
2	nil	3.7	4.9	92.1	2.04	14.8	31.3	53		14.8	—7.0

* "Drainage time" was determined by a modification of Gartshore's procedure (10). It was the time required for filtration of a 4.8 cm. depth of stock at 0.7 per cent s.c. and 21° C. on a 200-mesh wire cloth filter with a constant vacuum of 5 in. mercury.

Strengthening by Alkalis

The strength of eucalypt groundwood was increased very greatly by simple treatments with alkaline solutions.* The increases in strength were invariably accompanied by decreases in bulk and Canadian standard freeness.

Sodium Hydroxide

Figure 1 shows the effect on the properties of a groundwood pulp of an extraction treatment with varying charges of sodium hydroxide. The strength increment rose as the charge of sodium hydroxide was increased to 10 percent. At this charge, only half of the sodium hydroxide was consumed, 12.0 percent of the pulp substance was removed, the burst factor of the pulp was trebled, and the tear factor doubled. The bulk and freeness were considerably reduced. At charges higher than 10.0 percent little additional sodium hydroxide was consumed and little further change was brought about in the groundwood. The brightness increment rose to a maximum at about 2 percent and then decreased at greater charges. The extraction of the strongly colored substances ceased at a relatively low charge of sodium hydroxide but at higher charges the unextracted coloring matters were darkened considerably by the action of the alkali, the more so as the charge of the alkali increased. The same thing was true of the coloring matter extracted by the higher charges.

* Patent applied for.

TABLE II
COMPARISON OF THE EFFECTS OF CHEMICALLY EQUIVALENT CHARGES OF VARIOUS ALKALIES ON THE STRENGTH AND BRIGHTNESS OF GROUNDWOOD

Pulp Treatment (1)			Pulp Properties					
Alkali used	Charge added	Charge H_2SO_4 (2)	Yield (3)		Burst Factor	Tear Factor	C.s.f.	B Brightness
	%	%	%	Bulk				
nil	nil	nil	100	2.77	5.9	17.6	75	51.4
NaOH	4.0	0.63	91.9	2.28	12.4	28.7	54	55.3
KOH	5.6	0.63	91.3	2.29	12.3	28.8	57	54.9
Na_2CO_3	5.3	0.55	93.8	2.63	8.7	22.1	62	53.8
NH_4OH	3.5	0.47	94.7	2.68	7.5	20.8	71	49.4
$Ca(OH)_2$	3.7	1.82	99.5	2.34	9.4	22.5	65	33.1

(1) All extractions were carried out at 50°C., 3.0 per cent stock concentration for 3 hours.
(2) The charge of sulphuric acid required to acidify the groundwood, washed after treatment, to pH 5.0.
(3) Based on untreated filtered pulp from the grinder.

Calcium Hydroxide

Calcium hydroxide was considerably less effective in increasing strength, and removed much less substance from the pulp than sodium hydroxide in equivalent charges (see *Figure 1*). In comparing the effects of sodium hydroxide with calcium hydroxide, it was found that a larger proportion of the added charge of calcium hydroxide was consumed; of this, a considerable amount was taken up by the pulp (see *Table II*). For a given amount of substance removed, calcium hydroxide caused larger increases in strength than sodium hydroxide. A serious disadvantage of calcium hydroxide as a strengthening agent for groundwood is its pronounced adverse effect on brightness. When the treated pulp was made strongly acid and washed thoroughly, the brightness was increased somewhat but the overall loss of brightness remained large.

Sodium Hydroxide Followed by Calcium Hydroxide

When groundwood that had been treated previously by extraction with 2.0 percent of sodium hydroxide was extracted further with 4.0 percent of sodium hydroxide, very little additional coloring matter was removed. The total quantity of alkali consumed, the loss of substance, and the total increase in strength were similar in magnitude to those found when 6.0 percent of sodium hydroxide was used in a single extraction treatment *(see Table I)*. When 3.7 percent of calcium hydroxide replaced the 4.0 percent of sodium hydroxide in the second stage of the double extraction treatment, the total charge of base consumed was slightly larger but the loss of substance and the increase in strength were slightly smaller. The increase in drainage time was considerably smaller than that caused by the treatments with sodium hydroxide alone. The decrease in brightness caused by the calcium hydroxide was much smaller than that observed when no pretreatment with sodium hydroxide was given, but it was still serious. The effect on strength of the calcium hydroxide in the second stage was greater than the effect on strength of the same amount in one single stage. Sodium hydroxide removed some of the substances which otherwise would have consumed a disproportionately large quantity of calcium hydroxide to form dark-colored insoluble compounds. As the result of the pretreatment more calcium hydroxide was available for strengthening.

Comparison of Alkalis

The effects on the strength and brightness of eucalypt groundwood of chemically equivalent charges of sodium, potassium, calcium, and ammonium hydroxides and of sodium carbonate are shown in *Table II*. All alkalis, with the exception of calcium hydroxide, removed 5 percent or more of substance from the groundwood and gave very dark-colored extracts. Calcium hydroxide removed only about 1 percent of the pulp substance, and the extract obtained was pale yellow in color. Sodium and potassium hydroxides were almost identical in their effects on the pulp. As observed before, calcium hydroxide caused a large decrease in brightness and only about half the increase in strength brought about by sodium hydroxide or potassium hydroxide. Sodium carbanate was still less effective than calcium hydroxide in increasing strength, but caused a small increase in brightness. Ammonium hydroxide caused only a small increase in strength and a small decrease in brightness.

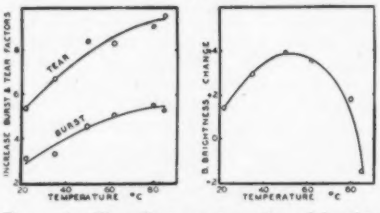


Figure 2.—The effect on strength and brightness of groundwood of varying the temperature used for the extraction by sodium hydroxide

Other Mechanical Pulps

Pulps made by mechanical processes other than simple grinding were strengthened by treatment with alkalis. *Table III* shows the effect on the properties of brown groundwood from eucalypt wood of treatments with sodium and calcium hydroxides. Again, sodium hydroxide was more effective than calcium hydroxide. *Table IV* shows the effects of calcium and sodium hydroxides on the strength of a wallboard pulp made by the Bauer refiner from eucalpt wood. The simple tests that were used are sufficient to demonstrate a relative increase in strength. As might be expected, repulped newsprint containing eucalypt groundwood was strengthened by treatment with sodium and calcium hydroxides.

TABLE III
INCREASES IN THE STRENGTH OF BROWN GROUNDWOOD BY TREATMENT WITH ALKALIS
Extraction conditions:—50°C., 3% stock concentration, 2½ hours

First Extraction		Second Extraction	Yield					
NaOH	$Ca(OH)_2$	$Ca(OH)_2$	Original pulp	Original wood	Bulk	Burst Factor	Tear Factor	C.s.f.
%	%	%	%	%				
nil	nil	nil	100	86	2.15	15.9	46.2	269
3	nil	nil	89.0	76.7	1.89	26.6	55.7	224
6	nil	nil	84.3	72.8	1.71	32.2	66.4	192
2	nil	3.7	89.2	77.5	1.84	27.4	56.4	214
nil	3.7	nil	93.0	80.6	1.93	21.8	51.2	224

TABLE IV
INCREASES IN STRENGTH OF BAUER PULP BY TREATMENT WITH ALKALIS
Extraction conditions:—50° C., 3% stock concentration, 3 hours

	Charge	Bulk	Burst Factor (1)	Tear Factor (1)	C.s.f.
Base	%	(1)	(1)	(1)	
nil	nil	2.19	0.92	6.9	340
NaOH	5	1.78	2.15	12.3	316
$Ca(OH)_2$	4.62	1.95	1.93	12.7	340

(1) Calculated from tests made with sheets at basis weight of 140 g./sq. m.

Variables in the Strengthening Process

Figure 2 shows the effect of varying the temperature used for the extraction on the changes in strength and brightness brought about by 3.0 percent of sodium hydroxide. The extent to which 3.0 percent of sodium hydroxide reacted with groundwood removing substances and increasing strength was found to rise, but at a diminishing rate, as the temperature was increased from 20°C. to 85°C. However, the upper limit that could be adopted for the temperature was set by the effect on the brightness,

which rose to a maximum at about 50°C., and then decreased sharply with further increase in temperature. A temperature of 50°C. was selected as most suitable for the extraction with sodium hydroxide.

As the time of extraction was increased (at stock concentrations ranging from 3.0 percent to 12.0 percent) the strength increment rose, but there was little further rise after 3 hours. Varying the stock concentration between 3.0 percent and 12.0 percent had little effect on the strength increment obtained. A stock concentration of 3.0 percent was used in most of the experimental work, but a higher concentration would no doubt be selected for use on an industrial scale to effect economy in heat and space. The conditions adopted for the purpose of the experimental work were a temperature of 50°C., a stock concentration of 3.0 percent, and a time of 3 hours. The variation from these conditions that is likely to be desirable in practice need not affect the increase in strength obtained.

In *Figure 4* the increases in burst and tear factors obtained from treatments performed with this fairly wide range of conditions are plotted against the charges of sodium hydroxide consumed and will be discussed later.

Differing Responses of Groundwood Pulps to Treatment

The quality of the wood used on the industrial scale varies considerably and the response of the groundwoods produced from the different varieties of wood has also been found to vary. The strengthening brought about by extraction with sodium hydroxide is shown by the data of *Figure 3*. No correlation was found between the magnitude of the changes in any of the properties in the pulp and the original values of the properties, except in the case of burst factor. The burst factors of the stronger pulps increased at a significantly greater rate with incerasing charge of sodium hydroxide than the burst factors of the weaker pulps. Nevertheless, the data were insufficient for the relationship to be accepted as general. The results for the different pulps were combined to give the "mean curves" shown in *Figure 3*. The dotted lines in *Figure 3* are the graphs for pulps giving the largest and the smallest increases in the strength and the brightness of the twelve groundwoods examined. The

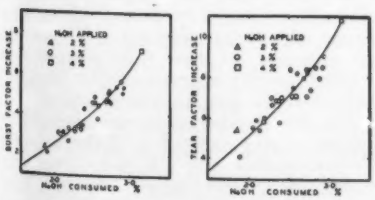


Figure 4

Figure 4.—The relation between increase in strength and amount of sodium hydroxide consumed in treatments at different temperatures, stock concentrations and times

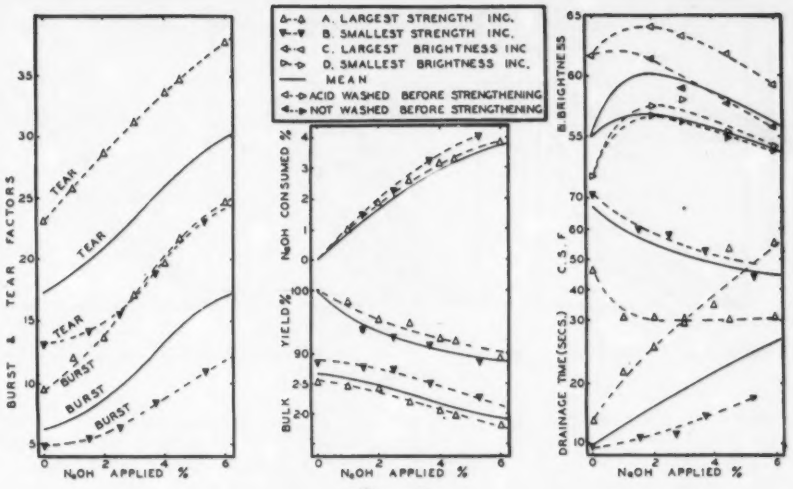


Figure 3

Figure 3.—Changes in physical properties of various groundwoods caused by treatment with sodium hydroxide

TABLE V

RELATIVE EFFECTIVENESS FOR STRENGTHENING GROUNDWOOD OF FRESH SODIUM HYDROXIDE AND SODIUM HYDROXIDE IN USED LIQUORS

First use of Sodium Hydroxide		Second use of Sodium Hydroxide			
		Charges Applied		Amount Consumed	
Charges Applied % o.d. pulp	Amount Unconsumed (by titration) (1)	By Titration (1)	From Effect on Groundwood (1)	By Titration (1)	From Effect on Groundwood (1)
3	14	14	14	14	14
4.5	28	28	25	28	25
6	37	37	30	28	28
7.5	43	43	40	30	34
9	49	49	42	34	35

(1) These amounts of sodium hydroxide were calculated as percentages of the original charge applied for the first use.

two pulps giving the largest and smallest increases in strength were different from those giving the largest and smallest increases in brightness. The variation of changes in properties other than strength or brightness was rather greater than that indicated by the dotted graphs for groundwoods giving the widest variation in strength increase.

The amount of sodium hydroxide consumed by the groundwood increased with increase in the charge of sodium hydroxide applied, but at a diminishing rate; the proportion of the charge remaining unconsumed rose fairly rapidly. As the charge of sodium hydroxide applied was increased, the strength increments rose slowly at first, then more rapidly, and finally more slowly again. The loss of substance, on the other hand, increased most rapidly at the lower charges of sodium hydroxide and less rapidly at the higher charges. Eventually, as shown in *Figure 1* and as described previously, an increase in the charge of sodium hydroxide brought about no further chemical reaction, loss of substance, nor increase in strength.

Counter-current Treatment

The sodium hydroxide remaining unconsumed after a strengthening treatment was shown to be capable of reacting with fresh groundwood and of increasing its strength and brightness. To obtain the results in *Table V*, five different charges of sodium hydroxide were used first to strengthen one set of samples of a certain groundwood. The liquors were filtered from the samples after the extraction, and the amounts of excess sodium hydroxide present were determined by titration and calculated as percentages of the original charge applied. Portions of the liquors were used without delay to treat a second set of samples of the same groundwood. The amounts of sodium hydroxide remaining unconsumed after the second extraction were again determined by titration, and calculated as a percentage of the original fresh charge. Both sets of groundwood samples were evaluated for changes in bulk, burst factor, tear factor, and freeness. The mean amounts of sodium hydroxide that must have been applied to or consumed by the second set of groundwood samples to give the changes observed for these four properties were obtained by interpolation from the relationships obtained for the first set. It will be seen from *Table V* that the charges of sodium hydroxide in liquors used a second time were equivalent in their effect on strength to charges of fresh sodium hydroxide a little smaller than those found by titration. The amounts of sodium hydroxide

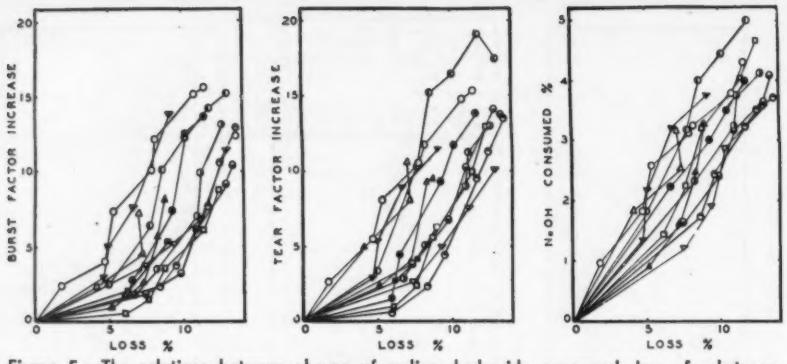


Figure 5.—The relations between charge of sodium hydroxide consumed, loss of substance, and increase in strength

shown by titration to be consumed in the treatment were similar in their effect on strength to equivalent charges consumed from fresh sodium hydroxide.

It is worthy of note that when groundwood pitstock was extracted with sodium hydroxide without prior washing, the charge of alkali rendered ineffective (by the dissolved acids) for increasing strength, was greater than that required to neutralize the dissolved acids to pH 8.3.

It would be feasible to use two or more counter-current extractions in order to reduce wastage of alkali when strengthening groundwood with the larger charges of sodium hydroxide. The groundwood could be extracted in the first stage with liquors returned from the second stage and containing 1 or 2 percent of unreacted sodium hydroxide. The effluent liquors from the first stage would contain relatively little free sodium hydroxide, and would be discarded. The partially strengthened groundwood would then be extracted in a second stage with fresh sodium hydroxide to complete the strengthening. The liquors containing unreacted sodium hydroxide would be filtered from the pulp and returned to provide the alkali for the first stage where the unreacted sodium hydroxide would be largely exhausted. In this way the larger increases in strength could be obtained with charges of sodium hydroxide rather smaller than those that were applied in the simple one-stage extractions.

Relations Between Sodium Hydroxide Consumed, Loss of Substance, and Increased in Strength

It is possible that the increase in strength of the groundwood might be brought about by some purely physical action of the alkali on the fibres. The alkali might, for instance, cause swelling. Swelling might result in increased flexibility which would permit a larger number of fibre to fibre bonds to be made in the paper sheet. The increase in strength might also be due to removal of some constituent by simple solution not involving chemical reaction. There is no unequivocal proof that the increase in strength is a direct result of a chemical reaction between sodium hydroxide and the groundwood. However, a close relationship does, in fact, appear to exist. *Figure 4* shows that the increases in strength, and the amounts of sodium hydroxide that were consumed, are fitted, within the limits of experimental error, by the one smooth curve irrespective of the temperature, stock concentration and time of reaction, and irrespective of the charge of sodium hydroxide applied (2 percent to 4 percent). Although at least two different groups of substances were being removed, it is probable that removal of the group containing the coloring matter was substantially complete in all cases since the pulp giving the lowest increase in strength had the maximum brightness.

The fact that alkaline extracts continue to consume alkali after being separated from the groundwood casts some doubt on the meaning of the relation between the amount of sodium hydroxide consumed and the increase in strength discussed above. The relationships between the amounts of substance removed and the increase in strength would not be subject to the same uncertainty. Such relationships will be discussed later.

It is well known that at least two different classes of substances are removed from wood by extraction with sodium hydroxide. One group contains the strongly colored substances which can be precipitated from solution by calcium salts, and which are probably derived in part from the tyloses in the true wood, from cellular kino and perhaps from some vein kino. The extracts obtained with the higher charges of sodium hydroxide may contain, in addition, some of the less resistant lignin. Substances in this first group probably predominate in the extracts obtained with charges of sodium hydroxide of less than 2 percent. Substances of the second group extracted from groundwood by sodium hydroxide are colorless or only lightly colored, and contain some sodium acetate resulting from alkaline hydrolysis of acetyl groups originally present in the wood, and probably also contain some hemicelluloses.

The possibility of recovering sodium hydroxide from sodium compounds in exhausted liquors, by metathesis with calcium hydroxide, was exploerd briefly, but the results were not promising. Separation of the precipitate was difficult. The amount of sodium hydroxide recovered was small, and the amount of calcium hydroxide required to obtain this small recovery was disproportionately great. Apparently the precipitate carried down with it a relatively large amount of calcium hydroxide. For example, a liquor obtained by treatment of groundwood with 3.0 percent of sodium hydroxide and containing unconsumed sodium hydroxide equivalent to 0.4 percent was treated with calcium hydroxide equivalent to 1.58 percent of sodium hydroxide. This precipitate was allowed to settle and was then removed by filtration. The liquor contained alkali equivalent to a total of 0.9 percent of sodium hydroxide; 0.4 percent was originally present, 0.4 percent was freed by the calcium hydroxide, and 0.1 percent was present as excess calcium hydroxide, all amounts being calculated as percentages of the original moisture-free pulp. Barium hydroxide gave the same result as calcium hydroxide. The recovered liquor was pale yellow in color. When it was acidified, and made 50 percent with respect to ethanol, a small quantity of a light-colored gelatinous precipitate

TABLE VI
SUBSTANCES EXTRACTED BY THREE PER CENT OF SODIUM HYDROXIDE

	Alkali				
	Free as NaOH (1) %	Combined as NaOH (3) %	Total (4) %	Total Solids (2) %	Organic Matter by difference %
A. Alkali extract	0.1	2.1	2.2 as NaOH	9.9	7.7
B. Lime-treated extract	0.7	1.6	2.3 as NaOH	5.6	3.3
C. Precipitate	..	..	1.6 as $Ca(OH)_2$	6.4	4.8
B + C					8.1

(1) Determined by titration of the liquors about seven days after the groundwood was extracted.
(2) Determined by evaporation to dryness and drying at 105°C., and calculated as a percentage of the m.f. groundwood extracted.
(3) The difference between total and free sodium hydroxide.
(4) Determined by ashing the total solids, adding excess acid to the ash, and back titrating with alkali.

formed, suggesting the presence of hemicelluloses. It will be seen from *Table VI* that calcium hydroxide precipitated more than half of the substances that were extracted from one groundwood by 3.0 percent of sodium hydroxide.

Graphs in *Figure 5* relate the amounts of sodium hydroxide consumed and the amounts of substance removed from twelve different pulps. Straight lines fitted to the points by the 'method of least squares' had slopes varying from 1.8 to 2.7. The mean slope was 2.2 with standard error 0.063. The value of 1.8 for the mean slope obtained from Mackney's data was within the range of those obtained from our data. The rather small amount of matter removed by each 1.0 percent of sodium hydroxide consumed suggests that the substances removed had the surprisingly low apparent average equivalent weight of about 88. This figure may be slightly low, because the calculation takes no account of the small increase in the amount of sodium hydroxide taken up by the groundwood as the charge of sodium hydroxide applied was increased. On the other hand, light-colored substances removed from groundwood continued to react with excess sodium hydroxide, so that the figure of 88 may well be too high. The equivalent weight would also be too high if substances are removed from groundwood without consumption of sodium hydroxide. An average equivalent weight of 83 may be calculated from the amounts of combined sodium hydroxide and organic matter in the lime-treated extract (see *Table VI*). The substances removed by sodium hydroxide probably include hemicelluloses but they must also include a considerable proportion of substances of relatively low equivalent weight. Sodium acetate probably derived from acetyl groups hydrolyzed from the pulp was detected, but no further analysis was made of the extractives.

Figure 5 also shows relationships for the twelve different pulps, between the losses of substance and the increases in tear factor and burst factor. As the loss of substance became greater, the strength rose slowly at first while the coloring matter was being removed and then increased much more rapidly after extraction of the coloring matter was substantially complete. At the higher charges of sodium hydroxide, the graphs relating the tear factor to the loss of substance are roughly parallel and approximate to straight lines. The corresponding graphs for burst factor are related similarly. Extrapolation of straight lines fitted to these data intercept the loss axis at points differing widely frome pulp to pulp, i. e., from zero to 7.5 percent (mean of 5 percent).

The above data are consistent with the hypotheses that the removal of the strongly colored substances brings about little or no increase in strength, and that the strength increase results mainly from the removal of light-colored substances containing acetate and probably also hemicelluloses. A considerable part of the strongly colored substances may well come from pulp debris, and from places in the fibre taking no part in the formation of papermaking bonds. On the other hand, the removal of the light-colored substances, associated with the relatively large increase in strength, may well occur from surfaces that are effective in the formation of bonds in the paper sheet. Jayme *(11)* and other workers have shown that there is an optimum hemicellulose content at which chemical pulps have maximum strength. It is possible that with eucalypt groundwood, also, some of the hemicelluloses must be removed before maximum strength is obtained.

If the removal of one group of substances was responsible for the whole of the increase in strength and removal of the other did not affect the strength at all, the intercepts of the straight line graphs on the loss axis, in *Figure 5*, would be a measure of the amount of the latter group of substances present in the original groundwoods. The large variation in the response of different pulps to strengthening might be due mainly to variation in the amount (or composition) of the group of substances the removal of which has little effect on strength.

TABLE VII
EXPLORATORY BLEACHING TRIALS WITH HYPOCHLORITES

Pulp	Pretreatment: Alkali	Pretreatment: Conditions	Bleach: Agent	Bleach: Available Chlorine %	Bleach: Excess Base	Total Increase Y' Brightness
A	.....	.....	$Ca(OCl)_2$	10	none	4.6
A	.....	.....	$Ca(OCl)_2$	20	none	11.1
A	.....	.....	NaOCl	10	none	9.9
A	.....	.....	NaOCl	20	none	20.6
A	.....	.....	NaOCl	15	none	12.3
A	.....	.....	NaOCl *	15	none	19.5
B	.....	.....	NaOCl	3.4	none	—4.0
B	.....	.....	NaOCl	6.8	none	3.4
B	.....	.....	NaOCl	3.4	present	10.2
B	Na_2CO_3	3%, 20° C., 30 min.	NaOCl	3.4	present	14.0
B	Na_2CO_3	10%, 20° C., 30 min.	NaOCl	3.4	present	16.2
B	NaOH	3%, 20° C., 30 min.	NaOCl	3.4	present	18.1
B	NaOH	10%, 20° C., 30 min.	NaOCl	3.4	present	19.5

* The bleach was applied in two stages—half of the total charge in each.

Bleaching by Hypochlorites

Exploratory experiments (see *Table VII*) showed that untreated eucalypt groundwood could be bleached without the addition of excess base but that very large charges of hypochlorite were required. Sodium hypochlorite was much more effective than calcium hypochlorite. The differences between the degrees of bleaching of eucalypt groundwood brought about by sodium and calcium hypochlorites were greater than those observed by Kingsbury *et al.* The lower charges of sodium hypochlorite caused a decrease in brightness which changed to an increase at higher charges.

The response of groundwood to bleaching was greatly improved when the bleaching was carried out in the presence of sodium hydroxide and buffer salts such as sodium carbonate, sodium phosphate, sodium silicate or sodium borate. The brightness rose steadily with increase in the initial pH, and the final pH, (see *Figure 6*), without passing through a maximum. The time required for exhaustion of the bleach also increased steadily with the pH. After being bleached in alkaline solution the pulps were washed well to remove excess base, and were acidified to discharge the dark color assumed by the pulp in the presence of alkali.

Aftertreatment

After the wash which follows the bleaching step the groundwood may be simply acidified to a pH value of about 5 using sulphuric acid alone, but if sulphur dioxide is added at this stage it increases the brightness by from 1 to 2 units. Sulhpur dioxide was used in the aftertreatment of all groundwood samples bleached in the experiments to be described in the following sections. The brightness of bleached groundwood may be increased by as much as 4 units by acidifying it strongly after the sulphur dioxide has been added and then washing it again to remove coloring matter.

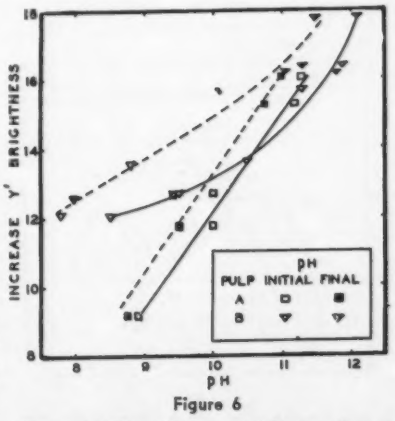


Figure 6

Figure 6.—The effect on brightness of varying the pH when bleaching by sodium hypochlorite

Hydrosulphites may be used to obtain increases in brightness still larger than those obtained with sulphur dioxide, but a second washing operation after bleaching then becomes necessary. If the maximum increase in brightness from the use of this reagent is to be obtained, the groundwood must be acidified strongly after the hydrosulphite treatment and washed well to remove reaction products.

Pretreatment with Alkali

Alkaline solutions added to pulp before bleaching extracted dark brown-colored substances which were decolorized when the sodium hypochlorite was added. This suggested that removal of this material with alkali before bleaching would reduce the quantity of hypochlorite required. Washing groundwood with 3.0 percent of sodium carbonate at 20°C. increased both the brightness of the pulp and its response to bleaching (see *Table VII*). After the treatment with sodium carbonate, bleaching was still favored by high pH; the brightness rose steadily with increase in pH from 8 to 12 (see *Figure 6*). The effectiveness of this treatment with sodium carbonate for improving the bleachability of groundwood increased steadily with increase in charge applied up to 10 percent.

Sodium hydroxide was even more effective than sodium carbonate for improving the response of groundwood to bleaching. Again the response of the groundwood to bleaching increased with increasing charge of base applied. The influence of charge of sodium hydroxide and temperature of the pre-extraction on the increases in brightness caused by bleaching are shown in *Table VIII*. Little further improvement in brightness was obtained by using a charge of sodium hydroxide greater than 3.0 percent or a temperature higher than 50°C. in the extraction. Charges of sodium hydroxide greater than 3.0 percent would of course give larger increases in strength.

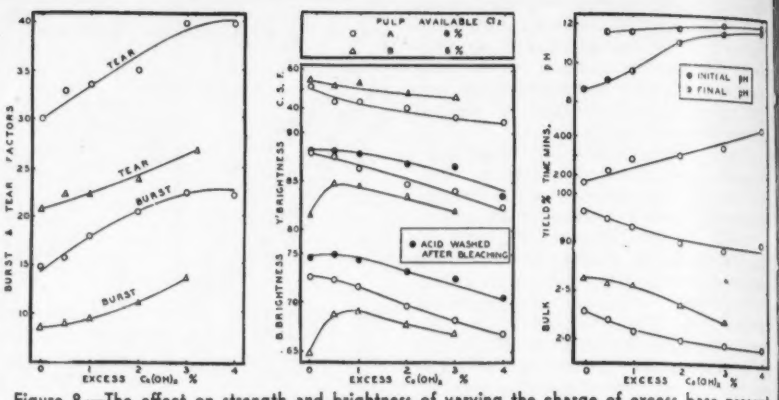


Figure 8.—The effect on strength and brightness of varying the charge of excess base present at commencement of bleaching of alkali extracted groundwood

TABLE VIII
PRETREATMENT OF GROUNDWOOD WITH SODIUM HYDROXIDE IN VARYING CHARGES AT VARYING TEMPERATURES TO IMPROVE BLEACHABILITY

Comparison of the Effectiveness of Sodium and Calcium Hypochlorites for Bleaching Alkali Extracted Groundwood

Pretreatment		Increase in Y' Brightness(3)	
Charge NaOH %	Temperature ° C.	Calcium Hypochlorite(1)	Sodium Hypochlorite(2)
1.5	20	14.1	13.4
1.5	50	17.2	14.8
1.5	80	18.4	15.5
3.0	20	15.6	13.7
3.0	50	18.4	15.8
3.0	80	19.3	15.3
10.0	20	17.6	16.5
10.0	50	19.9	17.0
10.0	80	19.3	16.1

(1) 3.0 per cent. of calcium hydroxide was added before the bleach equivalent to 3.4 per cent of available chlorine.

(2) 3.0 per cent. of sodium hydroxide was added before the bleach equivalent to 3.4 per cent. of available chlorine.

(3) The initial Y' brightness was 65.0.

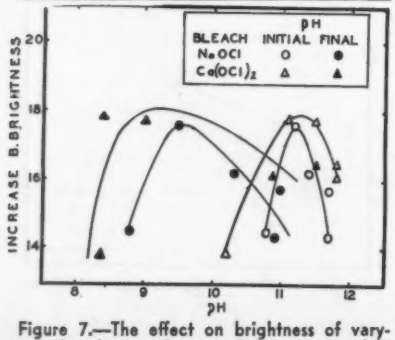


Figure 7.—The effect on brightness of varying the charge of excess base present when bleaching alkali extracted groundwood with sodium and calcium hypochlorites

TABLE IX
BLEACHING BY CALCIUM HYPOCHLORITE

The Effect of Pretreatment with Sodium Hydroxide and of Bleaching on Strength and Brightness and a Comparison of Bleaches at 20° C. and 50° C.

Pretreatment:— NaOH 2%, 60° C., 5% s.c., 20 minutes
Bleach:— 3% s.c., 20° C.—carried on to exhaustion
After-treatment A:— SO_2 0.5% + H_2SO_4 to pH 5.0
B:— SO_2 0.5% + H_2SO_4 as for A plus 1.0%, washed and neutralized to pH 5.0

			Bleach							
			Available Chlorine	Excess $Ca(OH)_2$	pH					
Expt. No.	Pulp	Pretreatment	%	%	Initial	Final	Temp. ° C.	Time min.	Yield	After-treatment
0	A	none	.....	.....	untreated	.....	.....	.....	100	
1	A	given	0	0	...	...	..	..	95.0	A
2	A	none	8.0	3.0	11.6	11.1	20	25	99.8	B
3	A	none	0	3.0	...	...	20	25	100.0	B
4	A	given	8.0	0	...	8.6	20	160	96.2	A
5	A	given	8.0	2.0	11.8	11.1	20	295	89.8	A
6	A	given	12.0	2.0	...	...	20	...	...	A
7	A	given	8.0	3.0	11.9	11.6	20	345	88.2	A
8	B	none	.....	.....	untreated	.....	.....	.....		
9	B	given	8.0	0.5	...	8.0	20	15	95	A
10	B	given	8.0	0.5	10.5	8.2	50	65	95	A
11	B	given	8.0	3.0	11.5	10.5	20	180	93	A
12	B	given	8.0	3.0	...	8.8	50	16	92	A
13	B	given	0	3.0	11.6	11.6	20	120	92	A

	Pulp Properties									
	Brightness								Air Resistance at Basis Wt.	
Expt. No.	B	Y'	Opacity	Bulk	Burst Factor	Tear Factor	C.s.f.	Breaking Length m.	sec.	g./sq. m.
0	53.3	66.0	98.7	2.65	7.8	21.7	63	1900	11.7	57.3
1	58.0	...	...	2.41	12.4	27.6	53	2600	...	...
2	55.4	72.8	...	2.24	13.5	26.5	46	2900	...	...
3	49.3	65.7	...	2.33	11.8	28.3	54	....	...	...
4	72.5	87.8	90.6	2.29	14.8	30.0	51	3400	32	55.6
5	69.5	84.8	...	1.88	20.3	35.0	40	....	...	...
6	74.7	87.2	87.5	1.92	21.1	35.6	31	4200	81	57.2
7	68.1	84.0	...	1.84	22.3	39.9	35	4300	94	58.4
8	54.0	...	...	2.67	7.6	21.2	61	....	...	...
9	69.8	85.9	...	2.45	13.3	27.4	49	....	...	...
10	69.6	86.0	...	2.47	12.8	27.4	46	....	...	...
11	70.2	84.7	...	2.05	19.4	33.8	37	....	...	...
12	70.4	85.2	...	2.16	17.4	33.5	43	....	...	...
13	53.3	68.0	...	2.15	16.4	33.1	49	....	...	...

Opacity, i.e., Printing Ratio, is 100 × the ratio of Y' brightness of one sheet with black backing to Y' brightness of an opaque pack of sheets, all sheets of basis weight 30 lb. m.f., 24 in. x 36 in., 500

Calcium hydroxide removed very little coloring matter from groundwood and reduced instead of increased the effectiveness of a subsequent bleach by calcium hypochlorite. When the groundwood was washed with acid after being extracted with calcium hydroxide, a small amount of coloring matter was removed. This combination of treatments increased the effectiveness of a subsequent bleaching step, but to a smaller extent than the simple extraction with sodium hydroxide.

Comparison of Sodium and Calcium Hypochlorites

Unless very large charges were applied, calcium hypochlorite with and without the presence of excess calcium hydroxide was almost completely ineffective in bleaching untreated groundwood (see *Table VII*, and Experiment 2 in *Table IX*). However, as shown in *Table VIII*, calcium hypochlorite with excess calcium hydroxide was more effective than sodium hypochlorite with excess sodium hyproxide for bleaching groundwood extracted previously with sodium hydroxide. When the charge of excess base added to the groundwood with the bleach was varied (see *Figure 7*), sodium and calcium hypochlorites gave similar maximum increases in brightness.

Simultaneous Bleaching and Strengthening

Eucalypt groundwood may be both strengthened and bleached in a process consisting of a pretreatment with sodium hydroxide followed by a treatment with either calcium or sodium hypochlorite with added base in the form of either sodium or calcium hydroxide.* The pretreatment with sodium hydroxide causes small increases in strength and brightness. The increases in strength obtained in the bleaching step are due mainly to the alkalinity of the solutions. Only small increases in strength are caused by the hypochlorite (see *Table IX*.)

Whereas initial and final pH values greater than 11 were desirable when bleaching untreated eucalypt groundwood or groundwood that had been pretreated with sodium carbonate, lower initial and final pH values were required if maximum brightness was to be obtained when bleaching groundwood that had been pretreated with sodium hydroxide (see *Figures 7* and *8*). Moreover, the time required for exhaustion of the bleach increased steadily with the pH. Presumably any increased specificity obtained by bleaching at the higher pT values was no longer an advantage after the alkali-soluble coloring matter was removed. The data of *Figure 8* show that some loss of brightness or increase in bleach requirement must be accepted if substantial increases in strength are to be obtained along with the increases in brightness. When the bleached groundwood was acidified to a pH value below 3 and washed, its brightness was increased by approximately 3.5 units; its strength remained unaffected.

The results described above were obtained with groundwoods of moderate initial brightness. One of the brightest eucalypt groundwoods that we have observed, made from a young *E. obliqua* tree, also responded well to bleaching. This groundwood in the untreated state had a B brightness of 66. The B brightness was 72 after the groundwood was extracted with 3.0 percent of sodium hydroxide; it rose to 80 when the pulp was bleached in the presence of 3.0 percent of excess calcium hydroxide with calcium hypochlorite equivalent to 6.8 percent of available chlorine.

Temperature and Stock Concentration

Increasing the temperature of bleaching from 20°C. to 50°C. greatly reduced the time required for exhaustion of the bleach without materially affecting the increases in either strength or brightness (see *Table IX*). The data in *Table X* show that increase in the stock concentration from 1.0 percent to 10 percent also greatly decreased the time required for exhaustion of the bleach. The brightness was at a maximum at 3.0 percent stock concentration, but increasing the stock concentration to 10 percent caused only a slight adverse effect on the brightness.

TABLE X
THE EFFECT ON BRIGHTNESS OF VARYING THE STOCK CONCENTRATION WHEN BLEACHING BY SODIUM HYPOCHLORITE

Alkali extraction:—NaOH 3%, 50° C., 10% stock concentration, 30 minutes
Bleach:—NaOCl equivalent to 6.8% available chlorine, plus excess NaOH 1%

Stock Concentration %	Time to Exhaust Bleach min.	B Brightness Increase
1	600	15.1
3	225	17.0
5	110	16.7
10	78	16.3

Effect of Bleaching on the Constituents of the Groundwood

There seems to be little doubt that the greater part of the increase in strength obtained during bleaching results from the same chemical changes that are brought about in the groundwood by alkali extractions in the absence of bleach. As mentioned before, there seems to be good grounds for believing that the increase in strength results from removal of material other than that responsible for the color of the groundwood.

From a comparison of the results of experiments 11 and 13 in *Table IX*, it will be seen that the loss of substance from the pulp caused by the bleaching reaction was quite small (about 1 percent), but no correction was made for ash content. With another groundwood the loss was 2 percent. These losses were probably caused, at least in part, by destruction of phenolic substances in the groundwood and by some attack on the lignin. Ferric chloride solution, when dropped on to paper containing eucalypt groundwood, reacts with the tannins or other phenolic substances present to give a strong blue-colored stain. The stain is only slightly paler when the test is applied to groundwood that has been extracted with 3.0 percent of sodium hydroxide. A paper sheet of groundwood, bleached with 6.0 percent of available chlorine (as calcium hypochlorite) after extraction with sodium hydroxide, gives no blue-colored stain. Hydrogen peroxide bleaches eucalypt groundwood without removing its characteristic reaction to ferric chloride.

No decrease of the Klason lignin content occurred when a groundwood was extracted with 2.0 percent of sodium hydroxide at 70°C. for 30 minutes, and then bleached by 2.0 percent of available chlorine as calcium hpyochlorite with the addition of 3.0 percent of calcium hydroxide. This treatment increased the brightness by 7.8 units. However, when the charge of bleach was increased to the equivalent of 8.0 percent of available chlorine, the increase in brightness rose to 16.8 units and the Klason lignin content of the bleached groundwood was reduced from 16.3 percent to 15.1 percent. The bleached pulp was obtained in 90 percent yield, so that the Klason lignin content of the bleached pulp was 13.7, calculated as a percentage of the untreated pulp, allowance being made for small differences in the ash contents. The loss of Klason lignin was therefore 2.6 percent. If some chlorination or oxidation of the lignin had occurred, the loss of lignin was greater than 2.6 percent. It is possible too that at the smaller chargeof available chlorine a small loss of original Klason lignin may have been offset by an increased in weight caused by chlorination or oxidation. Lignin contents were determined by the standard method of Division of Forest Products, C.S.I.R.O.

Acknowledgment

Publication of this paper is by permision of Australian Newsprint Mills, Ltd.

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The Manufacture of Insulation Board*

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The insulating board industry, which provides building commodities combining structural and insulating properties, has grown to almost double its World War II status. The production capacity of the 13 major manufacturers now totals more than two and one-half billion feet a year. The increased output has been made possible by plant improvements and the building of several large and completely new plants. The products are many, and include building board, sheathing, lath, decorative tile, acoustic tile, roof insulation, and industrial items for further fabrication. Insulating board sheathing has become the predominant sheathing material in many parts of the country.

Raw materials used by the several plants vary by locality and availability of material. Southern pines and hardwoods, sugar cane bagasse, poplar, jackpine, aspen, spruce, hemlock, and Douglas fir are the more common.

Types of equipment and manufacturing processes vary greatly. Some mills use grinders only for pulping. Other mills use entirely semi-chemical cooking; still others, a blend of both types of pulp. There are two types of board formers in use, the Fourdrinier and the Oliver. The board dryers are steam heated, or gas fired.

The Simpson Logging Company's woodfiber plant, located in Shelton, Washington, one of the newer plants, having started in March 1947, is now well into its fourth year of operation. This plant is one step of a program of complete forest utilization. The Simpson Logging Company's Shelton Working Circle comprises 280,000 acres of timber working on a sustained-yield basis, two sawmills, two plywood plants, a door plant, and a woodfiber plant.

The raw material used at the woodfiber plant is taken entirely from sawmill slabs and edgings and veneer trimmings. The slabs and edgings are selected, by stockpickers, from the sawmill refuse conveyor, chipped, screened, and conveyed to a 350 unit chip storage building. The veneer trimmings are chipped by a veneer chipper in the plywood plant and transported to the woodfiber plant by rail. Chip quality requirements are essentially the same as required for kraft pulping. The chips must be free from rot and bark, and must be of uniform size.

From chip storage, the chips are conveyed to the pulp building, with 20 percent of the chips going to an American Defibrator Company Size "D" Asplund, and 80 percent of the chips going to three stainless-steel-lined rotary steam cookers.

The Asplund is of stainless steel construction, and is equipped with a preheating chamber. It produces approximately 25 tons per day. The fiber discharges from the Asplund through a continuous discharge orifice and is blown directly into a Bauer refiner for further treatment.

The cooking operation is merely steaming, to soften the chips for reduction into fiber. The three 600 cubic foot capacity cookers are filled with chips, then steamed without the addition of liquor or chemicals. Air is relieved, or vented, from each cooker for a few minutes. After venting, pressure is raised, and the cooker is rotated to insure even steaming. After steaming, the chips are dumped into screw conveyor pits, and carried by flight conveyor to eight Bauer refiners.

The Bauer refiners used at the woodfiber plant are type 185, double disk mills, using the B-980 or fine tooth plate pattern. Each disk is driven by a 150 h.p. force ventilated motor, or a total of 300 h.p. per pulper. The chips are fed into the pulper at a controlled, uniform rate by a variable speed spike roll feeder. Hot water showers add water to the chips in the feed chute, to control plate consistency in the pulping zone.

It is possible to produce a wide range of freeness with the Bauer pulpers by varying the feed rate of the chips, and the micrometer setting, or distance between plates of the grinding segments, thus varying the horsepower output per ton of chips defibrated. The average for the plant is 30 horsepower days per ton. Pulp discharged by the pulpers drops into a tile-lined chest below the battery of pulpers.

Highest quality insulating board is produced by using a blend of fibers, rather than one stock of the same or uniform freeness. For this purpose, the woodfiber plant uses a blending box, wherein are blended a low-freeness Bauer stock, a medium-freeness Bauer stock, the high-freeness Asplund pulp, and a small percentage of finishing room broke.

These components are blended to produce a mixed pulp of the standard freeness necessary to maintain the desired forming characteristics on the board former. At the blending box, white water is added to the stock for dilution to 1 percent consistency for screening in two Trimbey centrifugal screens using 3/16 inch perforations.

The rejects or tailing from the Trimbey screens are returned to a Bauer pulper for reduction to fiber and the accepted stock flows into a Wood's washer for thickening to forming consistency. The pulp drops

(Continued on page 32)

* Presented at the 32nd Annual Convention of The American Pulp and Paper Mill Superintendents Assn., Portland, Ore.

PRICES

The prices below reflect market quotations in New York at the mill level on standard grades. Does not include spot offerings.

PAPER AND BOARD

Standard News, Delivered Ports

Rolls, contract, per ton	$114.00/116.00
Sheets	130.00/ —

Kraft—per cwt. 50# base wgt. OPS Ceiling CPR 88

F.o.b. Southern & Western integrated mills. C.l. Freight allowed up to $10 a ton.

Standard Wrapping, ctr. rolls	$7.75/ —
Butchers, counter rolls	8.25/ —
Standard Bag, mill rolls	7.50/ —
Shipping Sack, mill rolls	7.75/ —
Gumming, mill rolls	8.00/ —
Asphalting, mill rolls	7.75/ —
Envelope, Sub. 20, mill rolls	9.25/ —

Tissues— per ream 24x36 (480) 10 lbs. 2500 lbs or more

Wh. No. 1 Frd.	$2.25 /$2.40
Wh. No. 1 MG	2.25 / 2.40
Wh. No. 1½	1.95 / 2.05
Wh. No. 2	1.75 / 2.00
Kraft Anti-Tar 20x30	2.12 / 2.25
White Anti-Tar 20x30	2.20 / —

Toilet— per case of 100 rolls—1M sheets

Unbleached 4½x4½	$8.00/$8.25
Unbleached 4½x5, 650 sheets	6.65/ —
Bleached 4½x4½	10.00/12.50
Bleached 4½x5	9.96/ —

Per Case of 50 rolls—2000 sheets

Unbleached 4½x4½	$8.00/$9.75
Bleached 4½x4½	6.95/ —

Per Case of 100 rolls—1000 sheets

Facial, 4½x4½, 2-ply	$8.95/10.37
4½x5, 2-ply	10.25/10.75

Paper Towels— per case of 3750

Wh. Jr. M'tif'd 9⅛x9½	$6.40
Br. Sr. M'tif'd 9⅞x12	4.40
Br. Jr. M'tif'd 9½x9⅞	3.90
Br. Jr. Sgl. fold 9⅞x10¾	3.95
C-Fold 10⅛ min. x 14 max.	$5.90/$6.64
Blchd. 7½x11, 48/50 rolls	$6.80/$7.92

Manila, per cwt.

No. 1 Jute Tag, 100-lb., sheets	$20.55/22.55
Reg. Jute M.F. 40-lb., sheets	19.50/21.50
Printing Manila	10.50/12.00

Gummed Tape—per bdl., 500 bdls. or more

90-lb. 375 ft. GSI	$7.20 / —
60-lb. 600 ft. GSI	7.20 / —
35-lb. 800 ft. GSI	8.28 / —
35-lb. 500 ft. GSO	6.21 / —

MARKET WOOD PULP

First Quarter Contract Prices. Per Short Air-Dry Ton

	Varying freight allowances		On Dock Atlantic Ports		
	*U. S.	Canadian	*Swedish	*Finnish	*Norwegian
Groundwood	$92.50/ —	‡$95.00/100.00			
Sulfate, Bleached	145.90/ —	190.00/200.00	$230.00/ —	$230.00/ —	$230.00/ —
Semi-bleached Sulfate	140.00/ —				
Sulfate, Unbl.	132.50/ —	145.00/175.00	200.00/ —	200.00/ —	
Sulfite, Blchd.	140.00/ —	160.00/175.00	225.00/ —	225.00/ —	225.00/ —
Sulfite, Unblchd.	132.50/ —	150.00/160.00	200.00/ —	200.00/ —	
Sulfite, Unbl'd (Glassine)		164.00/ —			
Soda, Blchd.	140.00/ —	155.00/160.00			
Sulfite Screenings	72.50/ —				
Sulfate Screenings	67.50/ —				
Groundwod Screenings	60.00/ —				
Unblchd Sulfate Sideruns	132.50/ —				
Stand. News. Sideruns	92.50/ —	106.00 —			

* OPS Ceiling, CPR 49 ‡ F.o.b. Shipping Point.

Boards Delivered plant, per ton ..... CPR 108

Filled News	$110.00/ —
Plain Chip	105.00/ —
Blchd. Mla. L-d. Chip	150.00/ —
White Pat. coated .020	175.00/ —
Kr. Liner 42 lb. M sq. ft. $2.47	117.50/ —
Kr. Corr. .009 M sq. ft. $1.59	122.50/ —
Binders Boards	137.50/140.00

The following prices are representative distributors' resale prices:

Rag Content Bonds and Ledgers—
White, 20 lb.

Bonds	4 Ctns. per cwt.
100% Rag Ex. No. 1	$70.45/$75.90
100% Rag	62.65/ —
75% Rag	48.15/ —
50% Rag	38.90/ —
25% Rag	31.65/ 33.00

Ledgers	4 Ctns. per cwt.
100% Rag Ex. No. 1	$72.65/$72.80
100% Rag	63.90/ —
75% Rag	49.40/ —
50% Rag	40.20/ —
25% Rag	33.00/ 34.30

Sulphite Bonds and Ledgers
White, 20 lb.

Bonds	4 Ctns. per cwt.
Watermarked	$19.00/$20.50
Plain	18.40/ 19.50

Ledgers	4 Ctns. per cwt.
Watermarked	$20.30/$21.80
Plain	19.35/ 20.80

White Book

Conversion Coated	Case per cwt.
No. 1	$23.90/$24.65
No. 2	22.15/ 23.40
No. 3	21.90/ 22.40
Machine Coated	
No. 1	$18.40/$18.90
No. 2	16.65/ 16.90
Uncoated	
No. 1 Antique (Watermarked)	$18.65/$19.65
Offset	18.65/ 19.90
A Grade E. F.	18.10/ 19.90
A Grade S. C.	18.65/ 19.40
B Grade E. F.	18.40/ —
B Grade S. C.	17.40/ 19.15

‡ Indicates a price change.

WASTE PAPER MARKET

Prices to mills, per ton, f.o.b. cars shipping point (includes brokers' fee.) These quotations are a partial indication of the price range in each market on the date specified, as gathered from major dealers. ALL PRICES ARE STRICTLY NOMINAL.

	New York Feb. 8	Philadelphia Feb. 6	Boston Feb. 2	Chicago Feb. 4
No. 1 Mixed Paper	nominal	$10.00/ 11.00	$10.00/ —	$8.00/ —
No. 1 News	12.00/ 14.00	12.00/ 13.00	12.00/ 13.00	15.00/ —
Over-issue News	15.00/ 18.00	14.00/ 18.00	15.00/ 22.00	18.00/ —
Mill Wrappers	13.00/ 22.00	12.00/ 13.00	13.00/ 19.00	11.00/ —
Corrugated Containers	14.00/ 15.00	12.00/ 13.00	15.00/ 15.50	15.00/ —
Double Kraft Ld. Corr. Cuts	40.00/ 63.00	50.00/ 55.00	40.00/ 63.00	50.00/ 63.00
100% Kraft Corr. Cuts	60.00/ 85.00	60.00/ 90.00	75.00/ 80.00	75.00/ —
Used Sugar & Flour Bags	45.00/ 50.00	45.00/ 50.00	45.00/ 46.50	50.00/ —
Super Resorted Br. Kraft	45.00/ 60.00	45.00/ 55.00	45.00/ 60.00	50.00/ —
New Br. Kraft Env. Cuts	100.00/115.00	100.00/105.00	100.00/125.00	90.00/ —
New Br. Kraft Cuts	90.00/100.00	90.00/ 95.00	85.00/105.00	80.00/ —
No. 1 Gdwd Shvs.	30.00/ 40.00	30.00/ —	33.00/ 40.00	25.00/ —
White Newsblanks	55.00/ 70.00	55.00/ 70.00	55.00/ 75.00	45.00/ —
No. 1 Flyleaf Shvs.	40.00/ 55.00	40.00/ 55.00	45.00/ 70.00	50.00/ —
No. 1 Soft Wht. Shvs.	120.00/130.00	110.00/120.00	120.00/130.00	115.00/ —
Super Soft Wht. Shvs.	140.00/150.00		135.00/150.00	125.00/ —
Hd. Wht. Shvs.	140.00/150.00	140.00/150.00	145.00/165.00	130.00/ —
Hd. Wht. Env. Cuts	165.00/185.00	165.00/175.00	165.00/180.00	140.00/ —
New Manila Env. Cuts	100.00/105.00	120.00/ —	110.00/125.00	55.00/ —
Col. Tab Cards	75.00/ 90.00	80.00/ 90.00	80.00/ 95.00	60.00/ —
Manila Tab Cards	110.00/120.00	125.00/130.00	120.00/130.00	90.00/ —
No. 1 Mixed Ledger	65.00/ 80.00	75.00/ —	85.00/ 95.00	65.00/ —
White Ledger	100.00/105.00	95.00/110.00	95.00/110.00	80.00/ —
No. 1 Book & Mag.†	32.00/ 37.00	22.00/ 24.00	29.00/ 32.00	20.00/ —
No. 1 Rep'd. Hvy. Books‡	43.00/ 50.00	32.00/ 35.00	40.00/ 55.00	35.00/ —

†Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% groundwood. § Deld.

RAG MARKET

New Domestic Cotton Cuttings
OPS Ceiling Price, CPR 28
Delivered Mill Basis

Add 7½% Dealer Commission

No. 1 White Shirts	$21.00
No. 1 Unblchd. Muslins	21.00
Blchd. & Unblchd. Underwears	21.00
Blchd. Canton Flannels	21.00
No. 1 Light Silesias	16.00
No. 1 Light Prints	11.50
No. 1 Blue Overalls	14.50
Suntan Khakis	11.50

Add 10% Dealer Commission

Fancy Shirts	$10.00
Indigo Blues	10.00
Mixed Khakis	8.00
Corduroys	8.00
Cottonades	8.00
No. 1 Washables	6.50

Old Domestic Cotton Rags
(Prices to Dealers, f.o.b. Ship. Pt.)

	Per 100 lbs.
Mixed White	$6.00/$6.50
Cotton Pants & Overalls	6.00/ 6.25
Thirds and Blues, Repacked	5.00/ 5.50
No. 1 Roofing Rags	1.20/ 1.25
No. 2 Roofing Rags	1.00/ 1.10
No. 3 & 4 Roofing Rags	.90/ 1.00

Bagging
(Prices to Dealers, f.o.b. N. Y.)
PRICES NOMINAL

	Per 100 lbs.
Foreign Gunny	$5.50/$6.75
Domestic Gunny, No. 1	5.50/ 6.50
Heavy Wool Tares	5.50/ 6.00
Foreign Manila Rope	9.00/ 9.25
Domestic Manila Rope	9.00/ 9.25
Jute Strings	6.00/ 6.50
No. 1 Sisal Strings	8.50/ 8.75
Paper Mill Tares	5.25/ 5.50
Foreign Scrap Burlap	5.50/ 6.50
Domestic Scrap Burlap	5.50/ 6.00
Austr. Wool Pouches	7.50/ 8.00
New Burlap Cuttings	7.00/ 7.50

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PULP

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SELLING AGENTS

MATERIAL PRICES

Aluminum sulfate:		
coml. bags, wks.....cwt.	1.65	
iron-free, c.l.	3.25	
Alcohol, ethyl:		
tax free, dms. c.l.....gal.	1.01	/ 1.05½
deld. East Miss.		
Alcohol, methyl:		
Synthetic, Zone 1, dms.		
c.l. fit. alld.....gal.	.44	
Casein, acid prec.:		
dom. sh. pt. c.l. .....lb.	.27	/ .38
imp. ex. dock .....lb.	.20	/ .29
Caustic soda:		
c.l. wks. solid, 76% cwt.....	3.35	
flak. & grd. 100-lb. drums...	3.75	
liquid 50% tanks....	2.55	
liquid 70% tanks....	2.65	
China clay:		
dom. air-float. c.l. wks. ton	10.00	
water-washed, lump, filler....	11.00	
coating	17.60	/30.50
imported, ex whse...short ton	15.20	/28.35
Chlorine:		
single-unit tanks, works..cwt.	2.70	
multi-unit .....cwt.	3.20	/ 4.40
Formaldehyde:		
USP, inh. dms, c.l. wks....lb.	.0625/	.0675
l.c.l., E. wks.....	.0675/	.0725
Fuel oil:		
Bunker C, No. 6 Cal. hvy.		
tanks, refinery .....bbl.	1.95	/ 2.15
light .....bbl.	2.00	/ 2.25
Hydrogen peroxide:		
USP, 35% cbys. E. of Miss. lb.	.23½/	.26½
Lime:		
hydrated, bags, wks. ....tons	13.50	
Rosin:		
B gum, drms, c.l. Savan..cwt.	7.00	/ 9.08*
K, M, N .....cwt.	7.65	/ 9.49*
FF, wood, do.....cwt.	6.80	/ 7.30*
* OPS Ceiling, CPR 52.		
Rosin size:		
70%, gum & pale grds, tank cars, south, sh. pt. .....cwt.	6.60	/ 6.70
Salt cake:		
dom. bulk, c.l. wks.....ton	17.00	
wks. frt. all.....ton	20.00	/22.00
Soda ash:		
light, 58%, bags, wks.....	1.50	
bulk .....cwt.	1.20	
Sodium silicate, 40°:		
turbid. c.l. wks.....cwt.	1.30	/
l.c.l. wks.	1.60	/ 1.85
Sodium peroxide:		
dms. c.l. E. of Miss.....lb.	.21	
l.c.l. do. .....lb.	.21½/	.22
Soybean, protein:		
chem. isol, wks, c.l., bags..lb.	.25	/ .29
Cinn. and Chic.		
Sulfuric acid:		
60° Be. cbys. c.l. wks.....cwt.	1.75	/ —
l.c.l. wks. .....cwt.	2.05	/ 2.85
Sulfur:		
crude, c.l. mines, contract, long ton	21.00	/22.00
f.o.b. vessels Gulf	22.50	/23.50
Sulfur dioxide:		
liquid, coml. cyl. wks.....lb.	.09	
multi-unit cars .....lb.	.0535	
Starches:		
pearl corn, bags, c.l. wks..cwt.	6.44	/ —
white dextrines, c.l. wks...cwt.	7.83	/ —
potato, Idaho, c.l. wks....cwt.	6.50	/ —
potato, Maine, c.l. wks....cwt.	nominal	
tapioca, conv. dextrines...cwt.	6.75	/ 8.00
Talc:		
domestic, 50-lb. sacks, c.l. wks. .....ton	25.00	/30.00
Titanium dioxide:		
anastase, c.l. deld., bags...lb.	.21	/ .21½
l.c.l. deld. .....lb.	.22	/ .22½
rutile, c.l. deld.....lb.	.23	/ .23½
l.c.l. deld. .....lb.	.24	/ .24½

Manufacture of Insulation Board

(Continued from page 30)

from the washer into a pulp chest wherein is added a fungicidal agent for termite protection, and the sizing material. This is rosin, wax, or asphalt emulsion, depending upon the product. Pulp is then pumped to the machine chest ready for board forming.

Operating in conjunction with the pulping equipment is a Waco type filter, or save-all, manufactured by Improved Paper Machinery Company. This filter has a 40 mesh plain weave endless wire, 166 inches wide x 371 inches long. The wire travels around a forming roll and has a fine mat of slow Bauer stock formed on the face. After passing over a top wire guide roll, the wire travels around the face of a large grid-faced drum immersed in a vat of water, to be filtered. As the water passes through the facing wire to escape to the water leg, the fine fiber is filtered out and retained in the stock mat. After leaving the face of the large revolving drum, the wire passes around a rubber-faced roll, and the stock mat is couched off to the face of the rubber roll, and a doctor blade doctors the stock into a chest below the filter. The wire continues around the forming roll and receives the new stock mat for filter.

The filtrate from the filter is at 1.0 to 1.25 lb. per thousand gallons. Water to the filter is at 7.0 lb. per thousand gallons. The fiber loss from the plant to the sewer per day is 2,000 lbs.

This plant is specifically designed to minimize the pollution problem. The absence of chemical and liquor in the cooking process, and the low fiber loss, have resulted in very good operation from the pollution standpoint.

The Downington 8-foot Fourdrinier-type board former is of cantilever construction, with the wire extending through the entire press section of four pair of suction press rolls. The bottom roll of the fourth press compares to the couch roll of the conventional type machine, and does most of the pulling on the wire. Presses on this machine are: one pair of 14 in. diameter suction rolls, two pair of 18 in. diameter suction rolls, and one pair of 30 in. diameter suction rolls. All press rolls are driven, both top and bottom rolls. All top press rolls are pneumatically loaded, and press against stops to maintain even press opening across the nips. The top press rolls are encased in a top wire, 113 in. x 54 ft. 8 in., so that the pressing is done between two wires. No press felts are used.

The fourth press delivers the sheet onto a roll table section called the "tipple section." Here the production loses any similarity it has to pulp and paper manufacture, and becomes a building material. The sheet is rough

trimmed on the edges, and cut into 16-foot lengths, then fed into an 8-deck Coe dryer. The dryer is steam coil heated, is 385 feet long, and is of 3-zone construction with a circulating fan on each zone, or section. The average time in the dryer on ½ in. board is two and one-quarter hours.

Imagine the predicament of a machine tender who makes a minor change in stock on the board former, and then must wait two hours and fifteen minutes and will have 9 percent of the day's production in the dryer before he can get a dry end test. To eliminate this problem, standard plant testing procedures include frequent testing of the wet pulp sheet before entering the dryer. Operating data on the type of stock, freeness, percent bone dry, and wet weights or densities, enable the machine tender to predict exactly the specifications of the finished board.

The large sheets coming from the dryer are fed automatically through an 8-foot x 20-foot saw combination to trim the board to finished size for wrapping, or small blanks for further processing. The 8-foot saw is equipped with double saw arbors, and there are two 20-foot saws. This arrangement is for the purpose of eliminating down time on the board former for board size changes. The product line contains 150 products of varying sizes and thickness, all of which come through one board former. Therefore, it is imperative that grade change time be at a minimum.

Finishing room, or dry end, operations consist of resawing, laminating, tenoning (tile cutting), painting, drilling, and wrapping. To do this work the finishing room is equipped with two double-end tenoners, a 4-foot by 14-foot resaw, two acoustic tile drill presses, a glue spreader (laminater), and a paint line. Saw particles, trim, and broken board are fed back into the pulp system, after disintegration in a Hydrapulper.

Instruments, testing procedures, quality standards, and specifications are under the jurisdiction of a quality control department. Federal Specifications LLL 321-b and the more recent CS 42-49 specifications establish minimum quality standards for transverse strength, tensile strength, thermal conductivity, water absorption, deflection, and lineal expansion.

The classes of board, as outlined by Federal Specifications are as follows:

A. Building Board
B. Lath, for plaster base
C. Roof Insulation
D. Interior Board, factory finish
E. Sheathing
F. Flame Resistant Finish

Each manufacturer establishes its own standards at higher levels, or more rigid requirements, than the Federal Standards. Our woodfiber plant follows this procedure, and has established all board specifications for plant quality control at a level much higher than minimum Federal requirements.

Alabama By-Products Corporation to Make More Coke and Coal Chemicals

to Meet Southeast's Fast Growing Demands

ALABAMA BY-PRODUCTS CORPORATION of Birmingham—one of the Nation's largest commercial coke producers—is now rushing to completion the fifth expansion program in its history. Because of the tremendously increased demand for coke from the Southeast's flourishing foundry trade, the Company is building a new battery of coke ovens which will bring its capacity to over 900,000 tons a year. It is likewise stepping up the output of its coal chemicals and by-product gas.

"Our large expansion program helps assure an ample supply of quality coke for the Southeast's fast growing malleable and grey iron industry," says Phil H. Neal, president of ABC. "Capacity of our plant has been increased more than fivefold since our Company was organized. Biggest factor in our growth has been the broad-scale industrial development throughout the Southeast. Another is Birmingham's superior location as a distribution center—not only for the whole Southeast but for all the 31 States we serve and our export markets in Canada, Cuba and Mexico."

ABC is one of scores of Birmingham district enterprises that have spiraled from small beginnings into nationally known industries. New plants will find even greater growth opportunities because of the accelerating progress of the South. Stake your claim now.

* * * * * *

The Committee of 100 or any of the undersigned members of the Executive Committee will welcome the opportunity to give you confidential and specific data regarding the advantages of the Birmingham district for your plant, office or warehouse.

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All acoustical tile specifications are governed by Federal Specifications SSS 118-a, and sound absorption coefficients as determined by the Acoustic Material Association testing in a laboratory at Riverbank, Geneva, Illinois, Simpson Research Laboratory's Western Electric sound tube is available, so that frequent checks can be made on the sound absorption qualities of mill run production.

This paper has been, in effect, a short plant tour of one of the newer insulating wallboard plants; a plant that is unique in one feature. I believe it is the first plant to use a process of mechanical pulping of old growth Douglas fir, and produce a commercial product.

The intensive, thorough, and painstaking research that made this plant possible, is characteristic of the insulating wallboard industry today. Each manufacturer maintains extensive research facilities for the development of new products, improvement of present products, and reduction of manufacturing costs. This program is responsible for the tremendous expansion of the industry in recent years, and is the reason for optimism for the years ahead.

NEW LITERATURE

Allis-Chalmers, Milwaukee 1, Wis. Bulletin, "Allis-Chalmers Totally-Enclosed Fan-Cooled Motors with Tube-Type Air-to-Air Heat Exchangers." Illustrates and explains typical construction features.

Barnstead Still & Sterilizer Co., 102 Lanesville Ter., Forest Hills, Boston 31, Mass. Bulletin No. 124, "Barnstead Bantam Water Demineralizer." Sales and technical copy on a new Demineralizer for laboratories.

John W. Bolton and Sons, Inc., Lawrence, Mass. Book, "The Fourth Bolton Award, 1950-1951, Prize Winning Essays on Personnel Problems Conducted under the Auspices of the American Pulp and Paper Mill Superintendents' Assn." Subject of award contest being, "Why Profit is Everybody's Job."

The Canada Paint Co., Ltd., P. O. Box 429, Montreal, Canada. Brochure, "Tri-Tex System of Color Engineering." Sponsored by four of Canada's largest paint manufacturing companies: The Canada Paint Co. Ltd., The Lowe Bros. Co. Ltd., The Martin-Senour Co. Ltd., The Sherwin-Williams Co. of Canada Ltd. Combined up-to-date knowledge that has gone into the formulation of this system of scientific color selection.

Elsevier Publishing Co., 445 Park Ave., New York, N. Y. Book, "Adhesion and Adhesives." A symposium by 14 specialists whose discussions have been edited by two eminent physical chemists, N. A. DeBruyne of England and R. Houwink of Holiand. $10 per copy.

Eriez Mfg. Co., Erie 6, Pa. Bulletin No. 561, "Eriez Magnetic Separators for the Paper Industry." Shows typical applications in pulp, paper, and felt mills.

Hercules Powder Co., Wilmington, Del. Leaflet, "Dresinol." Revised information about a series of resin emulsions containing 40 to 45 percent solids.

Lapp Insulator Co., Inc., Le Roy, N. Y. Bulletin 300, "Lapp Pulsafeeder, A Piston Diaphragm Pump for Controlled Volume Pumping of Fluids." Pertinent information about the Lapp Pulsafeeder to help solve problems where chemicals and accurate metering is involved.

David E. Long Corp., 220 E. 42nd St., New York 17, N. Y. Bulletin "DEL Protective Coatings." Describes briefly the use of these coatings to protect metal and masonry from corrosion due to acids, alkalies, alcohol, oil, gasoline, salts and water (heavy duty vinyl copolymer resins). Featuring: Series "A" Coatings (Heavy Duty Vinyl Copolymer Resins); Series "F" Coatings (100 percent Plastic Rubber Base, Styrene Butadiene Copolymer).

U. S. Government Printing Office, Washington 25, D. C. National Bureau of Standards Circular 512, "Methods of Measuring Humidity and Testing Hygrometers," by Arnold Wexler and W. G. Brombacher. Reviews methods for measuring water-vapor content of air and other gases. Discusses such hygrometric techniques as psychrometry, mechanical hygrometry, dewpoint measurement, electric hygrometry, gravimetric hygrometry, thermal conductivity, index of refraction, pressure and volume measurements, and dielectric constant.

Philadelphia Quartz Co., 205 Wacker Dr., Chicago, Ill. Bulletin, "Silicate P's and Q's." Features a tabulation of Philadelphia Quartz Co. silicates with the aevrage composition and physical properties.

J. E. Rhoads & Sons, 35 N. Sixth St., Philadelphia 6, Pa. Folder, "Rhoads Tannate Flat Leather Belting for the Paper Industry." Comprehensively illustrates and describes costs per ton of paper produced.

Southeastern Forest Experiment Station, Asheville, N. C. Booklet, Forest Resource Report No. 3, "The Timber Supply Outlook in South Carolina," by Robert W. Larson. Charts, graphs, tables, maps, pictures and text giving complete findings of the 1947 resurvey of South Carolina's forest resources, and shows what has happened to the State's forest resources in the 12 years since the original survey.

Westinghouse Electric Corp., Lamp Div., Bloomfield, N. J. Booklet A-6007, "Fluorescent Mercury Lamps, A New Light Source." Compact, detailed information on the Westinghouse JH-1 fluorescent mercury lamps. Also provides recommendations as to where the JH-1 is best applied, comparisons with light from other lamp sources, and complete tables of technical and transformer data are also given.

Mills Aid Scrap Drive

SPRINGFIELD, Mass. — The iron and steel scrap drive in Western Massachusetts has received substantial help by tonnage turned in by paper mills in this area. Nine mills from Berkshire, Franklin, Hampden and Hampshire Counties have delivered to scrap dealers one million pounds of dormant iron and steel scrap in the past four months.

This is an unusual record for a small group that does not generate iron and steel scrap in its manufacturing processes and the million pounds were delivered at one of the most crucial periods in the scrap shortage. Large amounts of copper and brass were also reported as recovered and sold.

MEISEL MACHINERY IS HELPING IN ALL FIELDS

Cigarette **Wax** **Photographic** **Jet Propulsion**
Condenser **Grease Proof** **Snap-out Forms** **Aero-engine Parts**

MEISEL PRESS MFG. CO. 950 Dorchester Ave., Boston

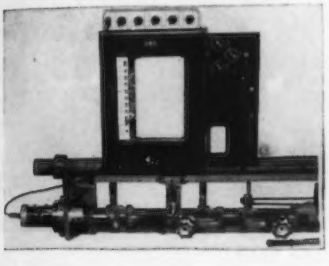
New Equipment
Supplies and Materials

Inertialess Weighing Systems

Scott Testers, Inc., 151 Blackstone St., Providence, R. I., announce an entirely new electrical weighing system for application to existing Scott Testers of the pendulum type.

This new Inertialess Weighing System replaces the conventional pendulum type head and recorder, converting the tester from constant-speed-of-pull operation to constant-rate-of-extension.

In summary, it is a conversion kit for changing existing constant-speed-of-pull testers, in the field, to perform tests on the constant-rate-of-extension principle, with ability to compress or magnify either the load or extension on the recording chart.



Application of the new System to existing Scott Testers is described as extremely simple. It may be installed on Models J, L, Q and X-3. The replacement, which can be made by non-mechanical personnel, requires about a half hour, consisting of removing the pendulum head by loosening four bolts and installing the new elastic spool head with the same four bolts. With equal ease, the potentiometer recorder replaces the old recorder. Current is applied by plugging into any 110-120V outlet.

Advantages claimed for the new system are: (1) as the name implies, inertia is practically eliminated from the weighing mechanism. The improved sensitivity reflects the behavior of the specimen in more minute detail, particularly when minute changes are magnified as described above; (2) it is now possible to apply a constant rate of extension (the elastic spool of the weighing head elongates only .0015" maximum, negligible consideration; (3) the flexibility of drive and recorder rates and wide range of chart speeds available, permits new studies of progressive test stages.

Conversions are available from 2 to 10 lbs. to 400-to-2,000 lbs. The change from one capacity to another is readily accomplished by changing the elastic member rather than the entire head. This again can be accomplished by non-mechanical personnel, without special tools, it is stated.

No-Prep Vinyl Primer

A new vinyl primer specifically developed for use on rusted steel surfaces without the necessity for previous preparation is announced by U. S. Stoneware Co., Akron, Ohio.

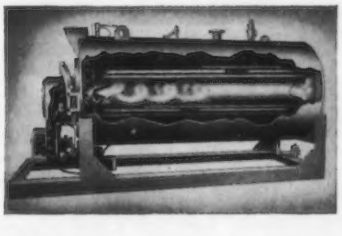
Known as Tygorust, it is easily applied by brushing, spraying, or dipping; dries hard and can be overcoated in a matter of minutes; adheres tentaciously to rusted steel, damp or dry; and, can be used with any type of finish coating — particularly vinyls.

Under exaggerated test conditions, the manufacturer claims the primer has been brushed and sprayed on damp rusted panels, and also brushed on dripping wet rusted panels, with completely satisfactory results. Dry, rusted steel has been successfully primed without even wire-brushing. It can also be applied to old, oxidized paint films (bituminous coatings excepted) without lifting or bleeding and can be safely overcoated with vinyl, nitrocellulose, alkyd and oil based finishes.

Packaged Steam Generator

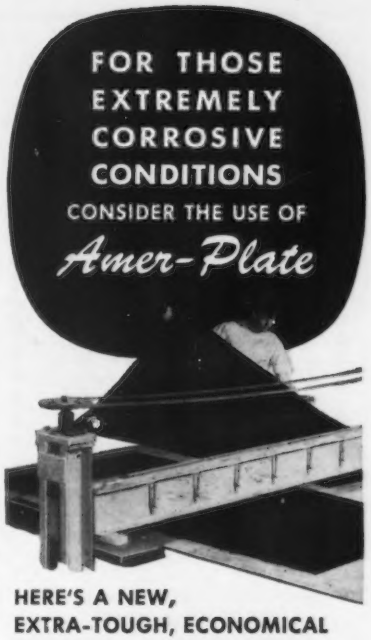
Simplicity in design and construction features the new Packaged Steam Generator announced by the Boiler Engineering and Supply Company, Phoenixville, Pa.

Fully automatic and self-contained, it is said to be easy to install, highly efficient, and economical to maintain. One of the boiler's important features is that front and back can be opened in 15-20 minutes, providing ready access for interior cleaning and servicing.



Available for use with heavy oil, light oil, gas or a combination, and in sizes from 10 to 500 hp., for 15 to 200 lbs. operating pressures, the unit is ready to operate when service connection are made,

The Continental unit is an improved 2-pass version of the Scotch Marine type boiler. Efficiency is claimed to be at least 80 percent, with steam moisture content under 1 percent. Operation of burner can be modulated from



HERE'S A NEW, EXTRA-TOUGH, ECONOMICAL INDUSTRIAL SHEET LINING

Especially designed to protect against extremely corrosive conditions, Amer-Plate is particularly adaptable for use in highly corrosive sewers, chemical storage tanks, tank cars and tank trucks hauling unusually corrosive solutions.

Composed of inert resins and plasticizers, Amer-Plate is impervious to gases, highly resistant to acids, alkalies, alcohol, oils, salts, and petroleum products. It has a very low moisture vapor transmission rate, will not support combustion, and contains no toxic materials.

Amer-Plate is a flexible thermoplastic sheet, practical for application to flat, curved, and angular surfaces. Its economy and effectiveness has been proved in the field in over 10 years of development and testing.

This remarkable sheet lining is available in two convenient types: Plain AMER-PLATE for existing steel or concrete tanks or structures and T-Lock AMER-PLATE for newly cast concrete pipe and structures.

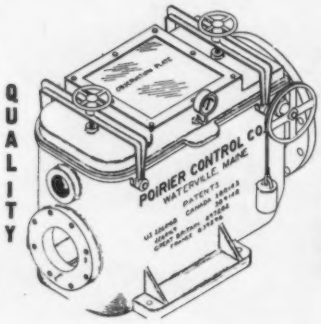
So...wherever you require long lasting protection against extreme corrosion, make a full investigation of the possibility of using Amer-Plate. Write for complete information.

Amer-Plate industrial sheet lining is the result of many years experience in the manufacture and application of Amercoat protective coatings.

AMERCOAT CORPORATION
A division of
American Pipe and Construction Co.
4809 Firestone Blvd., South Gate, California

IT'S THE POIRIER SYPHON SYSTEM

QUALITY PRODUCTION



DEPENDABILITY

FOR FULL INFORMATION WRITE

POIRIER CONTROL CO.

WATERVILLE, MAINE

35 percent to 125 percent, providing for periodic oversurge when required. To assure maximum heat transfer and low flue gas temperature, all fuel is burned in the water-surrounded boiler furnace, and the gases pass spirally through large 3" tubes. The 2-pass construction eliminates excess refractory, since the only refractory required is at the back of the boiler. A dry pipe in the boiler removes condensate from the steam to keep moisture content low. Also the steam tends to remain dry since a constant water level is automatically maintained, keeping the steam area uniform.

Equipped with the latest in automatic controls to minimize operating costs, further savings are said to result from an exclusive technique of rotary firing that assures maximum heat transfer. Another operating economy is gained by the burner and fan drive which is a standard motor with low horsepower requirements. The fan used is a forced draft type since it handles only clean air at boiler room temperature, rather than flue gases at high temperature as with an induced draft fan.

Heavy Duty Cleaning Unit

Announcement is made by Kelite Products, Inc., 1250 North Main St., Los Angeles 12, Calif. that their heavy-duty steam cleaning unit is now in production. Known as Power Master Unit, the machine is designed for industrial maintenance, construction and other cleaning operations.

Power Master Unit has two high pressure steam guns, each delivering 150 g.p.h. In addition to the unusually large steam cleaning capacity, the unit embodies a high-pressure water gun supplying hot or cold water at a pressure of 500 psi. Power blast feature of the unit delivers 1,000 gallons of water per hour for blasting away accumulations of mud, muck, heavy grease, etc. The water gun also has been found efficient in de-icing operations, it is said.

Fully illustrated literature may be had upon request to the manufacturer.

MERKOR

Non-Returnable, Durable standard mill core.

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Returnable and Non-Returnable extra strong mill core for regular and special needs.

ANY LENGTH, DIAMETER AND THICKNESS

Write for samples and prices

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Vinyl Resin Latices

The first in a series of new vinyl resin latices is now being produced for commercial consumption by Goodyear Tire & Rubber Co., Chemical Div., Akron, Ohio.

Known as Pliovic Latex 300, the vinyl latex is described as an aqueous dispersion of a vinyl chloride copolymer, and is the most recent development in Goodyear's vigorous expansion in the vinyl field. Completion of a preliminary testing program indicates that the vinyl latex should find wide use in the textile and paper coating industries, it was stated. Grease-proofness, chemical resistance, and resistance to moisture are some of the special properties imparted to fabrics and papers coated with the material. Physical properties are also improved. Samples are available.

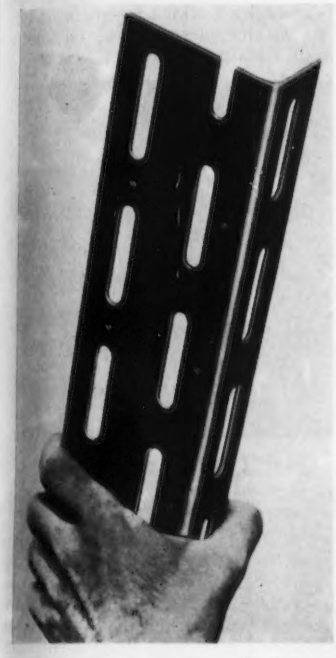
High Temperature Paint

A high temperature paint with excellent refractory properties is the product of Tempil Corp., 11 West 25th St., New York 10, N. Y.

Known as Pyromark, the new paint is applied like ordinary paint by brushing or spraying, dries quickly to a firm coat with good adhering qualities, and is recommended by the manufacturer for applications where considerable vibration, high velocity gas streams or high angular velocities are encountered. Available in green, maroon, blue, white, black or gray, the paint will survive temperatures of 2500° F. and higher, provided the surface to which it is to be applied will not of itself scale off, it is stated. Descriptive bulletin available.

Slotted-Leg Galvanized Steel Angle

Acme Steel Co., 2840 Archer Avenue, Chicago 8, Ill., announces the availability in limited supply of Dex-Angle, a 10-ft. long, 3 x 1.5 x .080-in. slotted-leg galvanizedsteel angle designed for all-purpose industrial fabrication.



The lengthwise rows of slots are designed to permit the rapid assembly by bolting of shelving, bins, scaffolding, ladders, assembly tables, motor and machinery mounts, partitions, conveyor-line structures, machine guards, hand rails, and other plant equipment. A hacksaw and a wrench are the only tools needed for assembly. However, the cutting operation can be speeded by the use of a special one-stroke shear-type cutter. Equipment can be built, altered or dismantled in a matter of minutes and the DexAngle, regardless of size, is 100 percent re-useable. No special brackets, braces, clips or hooks are required. Drilling and welding are unnecessary.

Diamond-shaped identations spaced at 3-in. intervals along the full length of the angle make measuring and cutting a simple operation. Slots are automatically in alignment for bolting when pieces are cut along these indentations.

Auxiliary components such as panels and casters give the assembled equipment a wider versatility. Steel panels, 36x6 in. and having 1-in. flanges, provide shelving that will support loads up to 300 lb. per panel. Ball-bearing casters quickly applied to provide portability to bins, carts, hand trucks and the like.

Although never before available in the U.S., DexAngle has found wide application in the manufacturing plants of England, Canada and Australia. It is manufactured and distributed in these countries under the trade name Dexion. Acme Steel Co. is the sole licensed manufacturer and distributor of DexAngle in the U.S.

Cobalt Isotope for Steel Inspection

Among the first industrial applications of the atomic age is this ampoule of radioactive cobalt wire, being successfully used by Empire Steel Castings, Inc. of Reading, Pa. for the examination of steel castings for internal defects.

Irradiated in a nuclear reactor at Oak Ridge, the cobalt isotope or "pill" sends out powerful beta and gamma rays. The gamma rays are capable of penetrating through steel ranging in thickness from one-half inch to six inches. When used with a photographic film, the rays will produce a picture of any defects in the steel.

The advantage of the isotope is its relatively low cost compared to radium, and its ability to be used without expensive machines. It consists simply of radioactive cobalt wire, mounted in a circular holder, and elevated over the casting by means of a cross-arm attached to a laboratory stand. The height of the ampoule from the steel is determined by the thickness of the steel. Exposures range from one-half to five or six hours.

The isotope is said to speed the work of inspection and it also has a distinct cost advantage over radium. It was purchased for $450. A comparable amount of radium weighing 525 milligrams, would cost approximately $10,000. The unit has a half-life of 5-3/10 years, but can be used up to ten years, with diminished efficiency after the half-life period.

Cut shows the isotope held over a casting which is being tested.

Spare Parts Kits for Life-Linestarters

To ease the problem of stocking spare parts for Life-Linestarters, kits containing complete sets of normal wearing parts are available from Westinghouse Electric Corp., 306 Fourth Ave., Pittsburgh, Pa.

These kits contain replacement moving contacts, moving contact springs, and stationary contacts. Six different kits cover 2- and 3-pole starters in sizes N0, N1, and N2. Two 2-pole kits can be used for 4-pole starters; one 2-pole and one 3-pole kit can be used for 5-pole starters.

New Mead Representative

General Paper Corp., announces that it is now a distributor in Minneapolis and St. Paul of the complete line of Mead book papers.

Supplying Your Requirements

AMERICA'S LEADING INDEPENDENT WASTE PAPER PACKERS

WASHINGTON, D. C.
PHILADELPHIA, PA.
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THOMAS PAPER STOCK COMPANY
1500 No. Hooker Street • Chicago 22, Ill.

AMERICAN PAPER AND PULP ASSOCIATION'S PAPER PRODUCTION RATIO REPORT

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

	Jan. 5	Jan. 12	Jan. 19	Jan. 26	Feb. 2
1952	93.4	98.6	99.3	99.5r	97.3
	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3
1951	94.2	100.0	101.3	101.0	100.2

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1951	99.3	101.3	101.9	102.8	102.2	100.1	88.6	97.7	94.3	100.6‡	98.2‡	89.3‡	98.4‡
1952	97.6‡												

‡ Preliminary.
r Revised.

COMPARATIVE YEARLY SUMMARIES

	1945	1946	1947	1948	1949	1950	1951	1952
Year to Date	86.4	95.4	103.7	100.6	94.7	93.2	99.5	97.6
Year Average	89.4	101.1	104.3	96.2	88.6	95.8	98.4‡	

PAPERBOARD OPERATING RATIOS†

	Jan. 5	Jan. 12	Jan. 19	Jan. 26	Feb. 2
1952	64	86	85	85	85
	Jan. 6	Jan. 13	Jan. 20	Jan. 27	Feb. 3
1951	91	106	104	104	103

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Ave.
1951	102	105	104	105	104	103	84	94	86	87	82	75	94
1952	81												

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

† Per cents of operation based on "Inch-Hours" reported on a 6-day basis to the National Paperboard Association.

SUPPLIERS

DOW CHEMICAL CO. has established a microbiological laboratory as a section of the biochemical research department. Dr. Paul A. Wolf, a member of the biochemical research department since 1942, has been placed in charge of the new laboratory.

Efforts of this section will be directed toward the development of new germicides and fungicides for control of bacteria, molds and yeasts that cause deterioration to industrial and agricultural products. Dr. Charles G. Humiston, Dr. Robert L. Johnson and Willard M. Westveer are to be associated with Dr. Wolf in the microbiology laboratory.

Avery Feiler

THE PULP & PAPER TRADING CO.
21 EAST 40TH STREET, NEW YORK 16 **LEXINGTON 2-8640**

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Rogers PAPERS

Folding Bristol, Index Bristol, Au Sable Bristol, Mill Blanks, Thindex Bristol, Antique Cover, Leathermade Cover, Ninety-leather Cover, Ledger, Bond, Ninepoint Postcard, Whiteface Tag, Folder Tag.

Sulphite Converting Specialties

Distributors for Pulp made by:
Consolidated Paper Corp., Ltd.
Montreal, Canada
Laurentide & Port Alfred
Unbleached Sulphite and Wayagamack Kraft

PERKINS-GOODWIN CO., internationally known pulp and paper marketing and management organization, has elected Avery Feiler as vice-president. Mr. Feiler has spent his entire business life in the pulp business. He joined the Scandinavian Pulp Agency in 1920, and became a part of the Perkins-Goodwin organization when the Scandinavian Pulp Agency was absorbed by Perkins-Goodwin in 1929. He was elected secretary and a director of Perkins-Goodwin Co. in 1947.

J. W. Crosson

CENTRAL NATIONAL CORP., exporters of paper, and an associate company of Gottesman & Co., Inc., announce that John W. Crosson is now associated with them in a sales and purchasing capacity. Mr. Crosson brings to Central National a wide and varied background of long standing in the paper industry, both in manufacturing and sales. He is also well known in the publishing and printing industries. More recently, Mr. Crosson was Eastern sales manager, in charge of merchant sales, for the Printing, Publication, and Converting Paper Division of the St. Regis Sales Corp.

PAISLEY PRODUCTS, INC., Chicago, has purchased the plant, equipment, formulas and manufacturing processes of the 50-year-old Layton Elastic Glue Co., also of Chicago. The acquisition will be operated as a subsidiary of the Paisley company. The present technical and plant staff of Layton will continue to operate the branch plant to maintain the same manufacturing technique and standard of quality as in the past. Arthur Fischer, former head of Layton Elastic Glue Co., will join Paisley in a consulting and advisory capacity.

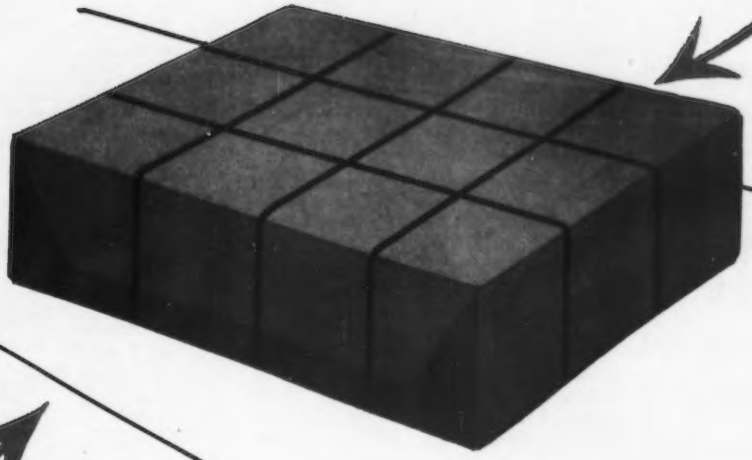
TAYLOR CORP. announces the opening of its offices at 52 Broadway. It will engineer and supply complete hardboard and wallboard plants. W. R. Taylor, formerly sales manager of U. S. Wallboard Machinery Co., is the president, and H. K. Linzell, formerly chief engineer, is the vice-president in charge of engineering of the new company. Both have been long associated with the wallboard industry and have designed and built plants in Finland, Sweden, Australia, South Africa and New Zealand.

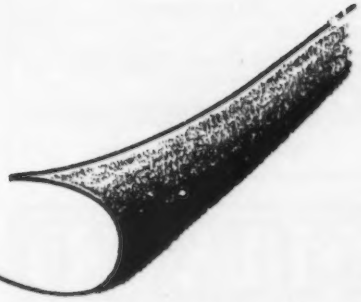
Lyddon & Co.

exporters of wood pulp
to all world markets

Parsons & Whittemore

paper exporters
wood pulp





London

Paris Zurich

Stockholm Oslo

Sousse Montreal

Buenos Aires Sao Paulo

10 East 40th Street, New York 16, N. Y.

BAILEY METER CO. of Cleveland, Ohio, has appointed W. Powell, Jr., manager of their branch office in Buffalo, N. Y., located at 705 Ellicott Square Bldg.

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Process Studies, Design, Specifications and Engineering Supervision
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The Controlled Flow
VICTORY BEATER
is manufactured by
THE NOBLE & WOOD MACHINE CO.
Paper Mill Machinery
Hoosick Falls • New York • U. S. A.

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Semi-Chem. and Chemical Pulp Processes
Pilot Plant Facilities
THE KINSLEY CHEMICAL COMPANY
Cleveland 11, Ohio

MISCO
STAINLESS STEEL CASTINGS
FOR ALL EQUIPMENT EXPOSED TO CORROSION BY SULPHITE ACIDS OR OTHER CORROSIVE AGENTS
MICHIGAN STEEL CASTING CO.
DETROIT 7, MICHIGAN

HALL LABORATORIES, INC., Pittsburgh, Pa., announces that Irving B. Remsen, Jr., formerly a division engineer of American Viscose Corp., has joined the Hall headquarters engineering staff for work as technical consultant on waste water problems in the industrial, municipal and utilities fields.

DU PONT'S POLYCHEMICALS DEPARTMENT has appointed Jerry D. Shaw manager of a new marketing sales section. Mr. Shaw was manager of sales to the paper, textile, and leather industries. The new section will combine functions of the former market studies, sales records and analysis, and product coordination sections. In conjunction with Mr. Shaw's promotion, Stuart P. Miller was advanced from assistant manager to manager of sales to the paper, textile, and leather industries.

Fighting Paper Wanted

Invitation to Bid has been issued by the New York Quartermaster Procurement Agency, 111 East 16th Street, New York 3, N.Y., on QM-30-280-52-1061, covering Paper, White, GPO Lot No. 79, Nautical Chart, 50 percent RAG, 6,000 reams. Bids will be opened February 20, 1952 at 11:00 A.M. (EST) at the New York Office. This procurement is for the U. S. Navy.

QM-30-280-52-1063, covering Barrier, Flexible Waterproof, 200 Yd. Roll, 28,100 rolls. Bids will be opened March 4, 1952 at 10.00 A.M. (EST) at the New York Office. This procurement is for the U. S. Air Force.

QM-30-280-52-1068, covering Envelope, Packing List, Waterproof, Kraft, 200,000 each; and Protector, Packing List, Black Asphalt Impregnated, Laminated Fiberboard, 270,000 each. Bids will be opened March 5, 1952 at 11:00 A.M. (EST) at the New York Office. This procurement is for the U. S. Army.

QM-30-280-52-1060, covering Paper, Map, Lithographic Finished, Coated Two Sides, White, Sub. 70, 20 x 22½", 8,000 reams. Bids will be opened February 19, 1952, at 2:00 P.M. (EST) at the New York Office. This procurement is for the U. S. Army.

QM-30-280-52-1064, covering Paperboard, Road Sign, Plain, 17 x 17 Inch, White, 563,000 each. Bids will be opened March 4, 1952, at 3:00 P.M. (EST) at the New York Office. This procurement is for the U. S. Army.

FOR SALE

CAMERON SLITTERS
1—52" Type 9-S
1—52" Type 8-S
1—42" and 1—62" Type 6
1—32" and 1—42" Type 40-2A.
1—42" and 1—62" Type 40-1-AF.
1—62" and 1—72" 10-S.
1—62" and 1—82" Type 10.

OTHER SLITTERS
1—62" Beck Duplex Rewind Razor Blade Slitter & Rewinder. Suitable for paper and plastics.
1—50" Meisel Shear Cut, Series OP-2.
1—62" Type AA Langston Shear Cut.
1—30" Langston Type A Shear Cut.
1—42" Kidder Merchant Model Pneumatic Control Shear Cut.
1—40" Hobbs Shear Cut, duplex rewind, with AC motor.

POWER PAPER CUTTERS
8—Seybold, 50" Precision, 65" 6Z, 44", 63" and 74" 20th Century; 48" and 55" Holyoke; 74" Dayton.
5—Oswegos, 32", 38", 44", 50" and 55".
5—Sheridans, 34", 36", 40", 50" and 55" & 1—32" Perfection Model.
1—Dexter 50".
5—Acme, 32", 34", 36", 46" and 50".
1—Smith & Winchester Undercut 63".

MISCELLANEOUS MACHINES
1—36" Hudson-Sharp A-2 3 color Aniline Printing Press, with 4-A Sheeter. Roll to roll or roll to sheet.
1—24" Schultz Automatic Waxed and Shelf Roll Machine. Rewinds 25' to 250'.
1—6½" and 1—20" four unit Champlain Rotogravure Presses.
1—72" Hudson-Sharp 25W Winder for Waxed and Household paper rolls.
1—34" Waldron Gummed Paper Breaker.
1—40" Special roll to roll coater or Lacquer saturator.
1—48" Waldron Roll to Roll Lacquer Coater
1—42" Waldron, 2 Roll, Roller Coater, Puts 2 coats on both sides of web at one time or any combination. Applies any material to paper, cellophane, plastics, etc.
1—Weber 5AG Grocery Bag Machine. Range 4¼x10¼ to 7¾x19¼.
1—Smith & Winchester Sack Machine. Range 11x26 to 17x31, suitable for Shopping Bags.
1—Sheridan Die Press, Model 8B Platen 33" x 46". Automatic Feeder.
1—52" Waldron Anti-friction Embossing Machine with Slitting attachment.
1—30" Bagprint 3-color Aniline Tailprinter.
1—Kidder 36"x48" 2-color Rotary Wrapping Paper Press.
1—45" Robinson Scorer.
1—40" Hot Waxer for Carton blanks. One or two sides.
2—Potdevin Waxing Machines, 82" wide.
1—Hudson-Sharp 3-deck Napkin Machine. 17" max. width x 16½" cut-off.
1—45" and 1—48" Hamblet Rotary Sheeter.
1—64" Dillon Duplex Rotary Sheet Cutter.
1—94" Moore & White Duplex Rotary Sheet Cutter.
1—116" Model 29 Hamblet Duplex Rotary Sheet Cutter, slitting attachment, Erie automatic layboy and twelve roll backstands.
1—36", 1—50" and 1—74" Hamblet Single Rotary Sheeters with Layboys, Slitting attachments and Backstands.
2—Asphalt Laminating machines, one 70" and one 88".
1—Bird Pulp Screen. Type A-1-6-3/16. Plates cut .014".
1—APMEW Pulp Screen. Plates cut .085".
1—24" Weiner Refiner.
1—84" Carthage wood chipper, 10 knives, belt drive.
2—36" x 76" Wet Machines.
2—#2 Lamoye Pulpers.
2—2000 lb. Niagara Iron Tub Beaters.
1—162" Moore & White 4-drum winder.
1—10' diam. x 132" face Beloit Yankee Dryer.
1—114" Sandy Hill eleven roll stack of Calenders.
1—61" Ten roll Holyoke Stack of Super Calenders.

We Want YOUR Used Equipment—Write Us NOW

GIBBS-BROWER CO. INC.
Please address reply to Room 902
21 East 40th Street, New York 16, N.Y.
Telephone Lexington 2-5759
F-15

CLEARING HOUSE

HELP WANTED

MEN WANTED — POSITIONS OPEN

We can place—general supt. for sulphite, pulp and specialty papers; supt. fine paper mill, Fourdrinier mach.; purchasing agent; sulphite pulping foreman; head shipper and receiver; mgr. or supt. to take complete charge wet machine board mill.

Master mechanic, large kraft paper mill; mechanical, heating, ventilating and instrument engineers (South); chemists, chemical engineers and laboratory men, preferably with textile education or Ph.D. degree and chemists for demonstrating and selling; Cylinder-Fourdrinier and Yankee machine foremen; machine tenders and back tenders.

Mechanical engineer; personnel director; training director; wage, salary, wage evaluation administrator, supervisor of stores and receiving (storekeeper); technical personnel officer; pulp mill manager for Northern unbleached sulphate; office man and asst. to pres. for firm packaging coarse papers.

LIST YOUR CONFIDENTIAL APPLICATION WITH US to keep informed of attractive positions open in the pulp and paper mills.

CHARLES P. RAYMOND SERVICE, INC.
294 Washington St., Boston 8, Mass.

SPECIALISTS IN PLACING AND SUPPLYING PULP AND PAPER MILL EXECUTIVES F-15

WANTED—Master Mechanic or Assistant for modern 3-Machine Tissue Mill. Progressive management; expansion program now under way. Fine opportunity for young/middle aged man to advance. Substantial paper mill mechanical experience with electrical background desirable. Give complete resume of experience in letter to Box 51-442 care Paper Trade Journal. Replies held strictly confidential. TF

Engineering Draftsmen or Machine Designers, also experienced Detailers.
A well established Wisconsin firm has permanent positions in Engineering Department for qualified men.
Experience in paper and pulp mill machinery or heavy equipment desired. Please submit complete resume and salary requirements when replying to Box No. 52-38 care of Paper Trade Journal. F-15

Personnel Service Associates
115 State St., Springfield 3, Mass.
Personnel Consultants
Confidential placement services for employers and employes in the pulp and paper industries and allied trades. Attractive positions and competent men always listed. (Administrative-technical-sales-general personnel) F-15

WORKING SUPERINTENDENT for small fast growing Eastern mill making lightweight specialties. Cylinder machine experience essential. State qualifications and salary expected. Address Box 51-596 care Paper Trade Journal. TF

HELP WANTED

SALARIED POSITIONS $3,500 to $35,000. We offer the original personal employment service (established 42 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC. —117 Dun Bldg., Buffalo, 2, N. Y. TF

WANTED—Board Mill Superintendent for a small 5-cylinder machine in rapidly growing company. Very good position for right man. Please do not apply if not a crackerjack on Folding Boxboard manufacturing. Address Box 52-52 care Paper Trade Journal. TF

PLANT ENGINEER—Opportunity for qualified graduate Engineer with extensive experience in general plant engineering and operations in the Pulp and Paper Industry and particularly the kraft process. Address Box 52-2 care Paper Trade Journal. TF

ADJUSTER, experienced on satchel bottom paper bag machines Potdevin, Fischer, S & W. Excellent opportunity metropolitan district. Address Box 52-43 care Paper Trade Journal. F-15

WORKING SUPERINTENDENT—For one machine folding boxboard mill. Must be capable assuming full responsibility for production and quality. $10,000 year starting salary. Address Box 52-44 care Paper Trade Journal. F-22

ASSISTANT WORKING SUPERINTENDENT for paper and board mill in New England. Would consider machine tender with opportunity of advancement. Address Box 52-59 care Paper Trade Journal. TF

PAPER AND PULP MAN—Experienced in the export field, wanted by export firm in New York. Address Box 52-63 care Paper Trade Journal. F-15

WANTED—Night Superintendent for specialty mill (board and paper) located in New Hampshire. State experience and salary desired. Address Box 52-55 care Paper Trade Journal. F-15

HELP WANTED

NEW SOUTH AMERICAN BOARD MILL
American Owned and Operated
WANTS
BOSS CYLINDER MACHINE TENDER

very experienced, familiar with all types board made on cylinder machine, also stock preparation. Excellent living accommodations. Pay no American income tax. Contract for one or two years. State age, experience, date of availability to Brown Paper Mill Co., Inc., Monroe, Louisiana. F-29

KRAFT MILL SUPERINTENDENT

A large Pulp and Paper Mill located in southeastern Quebec has an immediate opening for a Superintendent for its 300-ton Kraft Mill. Applicant should be fully experienced in mill operations, in control and study of technical problems, and in handling men. Graduate Mechanical or Chemical Engineer with some engineering experience preferred. Knowledge of French considered an asset. Salary open.

Please give full Particulars of experience, education, age, etc. with first reply, which will be considered confidential. Our staff have been advised of this advertisement.

Apply Box No. 52-64 care Paper Trade Journal. F-15

WANTED—Machinist Mechanic, capable of building and/or developing mechanical ideas of ours in sanitary tissue and wadding field. Wonderful opportunity for capable ambitious man for permanent, better paying position. Address Box 52-54 care Paper Trade Journal. F-29

SITUATIONS WANTED

MAINTENANCE MACHINIST fourteen years in paper converting, desires position in New York Area. Address Box 52-39 care Paper Trade Journal. F-15

FINISHING ROOM SUPERINTENDENT desires new connection. Age 48. 25 years experience on coated book, bonds and groundwood specialties. A-1 references. Address Box 52-61 care Paper Trade Journal. F-29

STAFF OR PLANT ENGINEER—Graduate licensed professional engineer, department head, 15 years experience Southern pulp and paper development, Kraft, dissolving cellulose semi-chemical, contract administration, design, construction. Address Box 52-60 care Paper Trade Journal. F-22

WANTED—SUPERINTENDENT OF FINISHING

A large diversified mill requires Superintendent of Finishing for its fine and specialty papers division processing 50,000 tons annually of sulphite bonds, offsets, mimeo, ledger, Bristols and sulphite converting papers.

Experience with modern conveyor line methods desirable. Position offers considerable scope for man with initiative and supervisory ability. Fine opportunity for Assistant Superintendent with the experience and ability required for advancement to top position.

Address in confidence CHARLES P. RAYMOND SERVICE, INC.

294 Washington St., Boston 8, Mass. Telephone Liberty 2-6547.

F-22

SITUATIONS WANTED

SUPERINTENDENT — Cylinder or Fourdrinier specialties. Available for change. Present employer seven years. Salary over $8000 per annum. Age 44. Chance for advancement. Address Box 52-57 care Paper Trade Journal. F-29

FOR SALE

FOR SALE—52" Cameron type 8 Model 5 Slitter; 48"Kidder Model CH shear cut slitter; 76" Cameron Rewinder; 75" Moore & White Upright 2 drum Reel; 42" Moore & White Sheeter; 100" Dillon Sheeter. Thomas W. Hall Company, Inc., 120 West 42nd St., New York, 18. TF

PAPER COATING MACHINERY MANUFACTURERS — Waxing, Oiling, Carbon Laboratory Coating and Treating and Flat Ream Measuring and Converting Machines. New improvement. THE MAYER MACHINE COMPANY, INC., 1313 Buffalo Road, Rochester, 11, N. Y. TF

FOR SALE

FOR SALE

1—50" Late Type Meisel Shear-cut Slitter and Rewinder. A-1 condition. Suitable for Adding Machine and Teletype Rolls. Address Box #52-67 care Paper Trade Journal. F-15

FOR SALE

1—72" web Cameron Automatic Tension Unwind Stand with KVP Photo-electric eye control. Address Box #52-66 care Paper Trade Journal. F-15

FOR SALE—Paper Cores, 3" and 6" diameter. Various Wall Sizes stocked, for immediate delivery in Chicago. ROUND TUBES AND CORES. Ch. 3-9646. F-15

FOR SALE

FOR SALE
1—Roberts Grinder for 4' wood, with stone and 2500 h.p. motor, with controls. New 1947. Used 6 months.
2—General Electric 2500 h.p. slip ring motors. 6600 volts—3 phase—60 cycle—257 r.p.m., with complete controls.
2—500 ton Pulp Baling Presses with pumping units and motor.
ROSS PAPER MACHINERY COMPANY
265 Passaic Street Newark, 4, N. J.
Tel. HUmboldt 2-2177 N.C.

FOR SALE—Selling out Set-up Box and Converting Plant with well known and standard makes, models, in all sizes of Slitters & Rewinders; Beck Sheeters; Thomson Die Cutters; Rotary Slitter/Scorers; S & S Wrappers & Gluers; Sgle. & Dble. Corner Cutters; Sgle. & Quad Stayers; Stitchers; Bdle. Tyers; and many other PAPER CONVERTING & FINISHING MACHINES. Write for listings. Address Box 52-21 care Paper Trade Journal. TF

FOR SALE—A going business wants to sell out fully equipped ribbon manufacturing plant—Complete with machinery, printing equipment, Inventory of raw and finished materials. For further particulars write Box 52-65 care Paper Trade Journal. F-15

ROSS PAPER MACHINERY CO.
265 PASSAIC STREET
NEWARK 4, N. J.
CONVERTING PAPER MAKING EQUIPMENT
NEW, USED, REBUILT PAPER AND PULP MACHINERY

MACHINERY WANTED FOR OUTRIGHT PURCHASE
From a Single Item to A Complete Mill.

BEATERS
1—Dilts 750 lb. Iron Tub. Roll 44" face x 50" diameter.
1—Downingtown 1000 lb. Iron Tub. New roll 48" face x 48" diameter.

CALENDER ROLLS
46 Chilled Iron Rolls—Assorted sizes.

CALENDER STACKS
1—3 roll—62". All rolls bored for steam.
1—Farrel Birmingham, 5 roll, 100" Calender Stack, with doctors, 2 rolls bored-for steam.
1—Black Clawson 124" 9 roll with doctors and oiling system.
1—Black Clawson 124" 7 roll with doctors and oiling system.
1—Black Clawson 90" 7 roll with 3 spare rolls.
1—Pusey & Jones 84" 4 roll, with doctors and drives.

CYLINDER MOLDS
1—134" face x 36" diameter, with stainless steel shafts.

DAMPENER
1—Valley Micromist Unit for water finish on paper—120" deckle.

DRYERS
2—124" face x 48" diameter.
1—77" face x 48" diameter—with gear.
1—120" face x 19" diameter—Baby Dryer.
1—102" face x 48" diameter, with bearings.
3—110" face x 42" diameter with bearings and gears.
1—109" face x 42" diameter Creping Dryer.
4—42" face x 36" diameter, with frames, gears and bearings.
19—46" face x 48" diameter, with gears, bearings and steam joints.
19—127" face x 42" diameter.
3—116" face x 48" diameter.
2—103" face x 48" diameter.
2—116" face x 36" diameter, with gears and bearings.
1—110" face x 48" diameter.
12—65" face x 36" diameter. Complete with 2 deck frames, gears, bearings, steam joints, felt rolls, sole plate and 2 press sections.

EXTRACTOR ROLLS
1—Downingtown Extractor Roll 128" face x 24" diameter. Anti friction bearings.

FILTERS
1—Oliver Vacuum Filter. Cylinder 8' face x 5' 6" diameter. Iron end vat.

FLAT SCREENS
3—8 plate Sandy Hill Roller Shoe with scrapers.
1—Sandy Hill 12 plate roller shoe.
3—Bagley & Sewall 8 plate, with scrapers and plates.
1—6 plate tailing screens with scrapers.
1—4 plate tailing screen with scraper.

HYDRAULIC PRESS
1—Thorpe 200 ton. Steam platens. 40"x40" with pump.

JORDANS
1—26 Miami, for motor drive.
3—Jones Majestics with base and couplings—
2—#3 Appleton with base and coupling.
1— Jones Majestic. Stainless Steel Filling.
3—E. D. Jones Pony, 3/16" stainless steel fillings—banded plugs. Spare new fillings.
1—Smith & Winchester Stainless with granite fillings.

LABORATORY EQUIPMENT
1—Nobe and Wood anti friction Jordan 13" plug —½" stainless steel fillings—direct connected to 10 h.p. 220/440/3 phase 60 cycle, 530 r/p.m. motor.

LAMINATOR
1—Black Clawson Duplex 65" Laminator with 5 presses—6 dryers 36" diameter, Unwind stands and rewind stands.

MOTORS
2—General Electric 2500 h.p. slip ring motors. 6600 volts—3 phase—60-cycle—257 r.p.m., with complete controls.
2—Westinghouse 200 h.p. 2200 volts—3 ph.—60 cycle—600 r.p.m. Synchronous speed with controls and grids.
1—Westinghouse 150 h.p. 2200 volts—3 ph.—60 cycle—580 r.p.m. with controls and grids.
1—General Electric—75 h.p.—2200 volts—3 ph.—60 cycle—430 r.p.m.
1—Allis Chalmers 30 h.p. 440 v. 660 r.p.m.
1—General Electric—25 h.p.—230 volts—3 ph.—60 cycle—300/900 r.p.m.
25 other 440 v. motors from 2 h.p. to 15 h.p.

PULP BALING PRESS
2—500 Ton Pulp Baling Presses with pumping unit and motor.

PULP EQUIPMENT
1—Mitts & Merrill #17 Pulpwood chipper.
1—Bird ball bearing Pulp Screen. Practically new. Used 6 months.
2—APMEW Ball Bearing Pulp Screens—30 ton capacity—outward flow.
1—D. J. Murray 10' x 25' Barking Drum.

PULPERS
2—#2 Lannoye.

PULPWOOD GRINDER
1—Roberts Grinder for 4' wood, with stone and 2500 h.p. motor, with controls. New 1947. Used 6 months.

PUMPS
44—Centrifugal Pumps, open & closed impellers. Direct connected or Belt Driven. Extended base for motor. Assorted capacities and heads. Most used less than one year.

REDUCERS
1—Link Belt 40 h.p. Ratio 2.2-1, 500 r.p.m.-227 r.p.m.

REELS
1—2 bowl 106"—18" diameter iron bowls.
1—2 bowl 94"—16" diameter bowls.

ROLLS—PRESS, COUCH, etc.
32—Press rolls, brass and rubber covered.
14—Couch rolls, brass and rubber covered.
250—Brass and steel carrying rolls.

ROTARY SCREENS
1—#2 Bird—Copper Vat.

SCREW PRESSES
1—Valley Voith Screw Press Size 2.
1—Valley Voith Screw Press—enclosed drive.

SHEETERS
1—Hamblet 124" Duplex Sheeter with maxim layboy—8 roll backstand—motor and starter.
1—Moore & White Simplex 114" Sheeter with slitters—counter. Maxim layboy overlapping delivery. 8 roll backstand, motor and starter.
1—48" Kidder Spot Sheeter.
1—64" Duplex Dillon with 15 roll Back Stand.

SHREDDERS
1—American 37" Hamermill, anti-friction bearing.
1—Jeffrey 26½" Knives—7 knife rotor—4 knife bed plate. Ball bearing.

SLITTERS AND WINDERS
1—Beloit 125" Paper Machine Slitter and Rewinder—42" rewind.
1—Hudson Sharp 25W—66" Wax roll slitter and rewinder. New 1947.
3—Cameron 42" Model 6—24" rewind.
2—Miesel 42".
1—Cameron 42"—Model 26—2A.
1—Cameron 72"—Model 8—40" rewind.
1—Beloit 80" 2 drum, with Lewellyn Drive, shear cut slitters, backstand—34" rewind.
1—Langston 50" Shear Cut with 25 sets of slitters and motor.
1—Cameron 44" model 9-5.

STEAM TURBINES
1—De Laval 225 h.p. Initial pressure 140 p.s.i. Exhaust pressure 35 p.s.i. Complete with gear reducer.
1—De Laval Variable speed—375 h.p. at 135 gauge and 30 p.s.i. exhaust. Complete with gear reducer.

STOCK PUMPS
1—Shartle 10 x 20 Single Plunger Pump.
2—Beloit 8x10 Triplex.
2—Deming 7 x 8 Triplex—all bronze. New 1947. Enclosed drives.
1—Triplex—8x10. Used less than 1 year.
2—Shartle Agi-flo. Suction 13" discharge 14" and 4". Anti friction bearings.

SUCTION COUCH ROLLS
2—Millspaugh 36" diameter x 234" drilled face with enclosed drive, water cooled bearings, 12" suction boxes and 1 spare shell.

SUCTION PRESS ROLLS
1—Sandusky 97" drilled face x 14" diameter.
1—Millspaugh 50" face x 14" diameter.

SUPERCALENDERS
1—Norwood 74" 9 roll with unwind and rewind. Complete with drive and 2 spare rolls.
1—Norwood 64" 10 roll with unwind and rewind. Complete with drive and 2 spare rolls.
1—Norwood 58" 9 roll with unwind and rewind. Complete with drive and 2 spare rolls.

THICKENERS
1—Glens Falls Machine Co.—cylinder 62 x 48—rubber couch 20" diameter.

TOILET TISSUE PERFORATOR
1—Paper Converting Machine Co. Model 141 automatic 81" Perforator, slitter and Winder —with three motors—ball bearing.

VACUUM PUMPS
2—Nash ½ H-5 Vacuum Pumps
2—Nash #3.
1—Nash #2.

WRAPPING MACHINE
1—Morrow Stevens type IC. Package thickness ¾" to 5". Used 30 days.

YANKEE DRYER
1—New Sandy Hill 100" face x 72" diameter, with bearings and doctor.

WHY LIST YOUR EQUIPMENT? — WE WILL BUY IT.

FOR SALE | **FOR SALE** | **FOR SALE**

FOR SALE

1 Section of Dryers Consisting of 54 Dryers, 48" diameter—130" trim—complete with frames, gears and bearings.

J. J. ROSS COMPANY

250 Frelinghuysen Ave. Tel. Bigelow 3-3720 Newark 5, N. J.

F-15

WANTED | **WANTED** | **WANTED**

PAPER CONVERTERS

G. B. GOLDMAN PAPER COMPANY

Sheeting — Slitting — Rewinding — Flat Cutting all grades of paper

BUYERS OF JOB LOT PAPER ITEMS — SALVAGE — REJECTS, SIDE RUNS — DAMAGED, ETC.

Third & Wood Streets, Philadelphia 6, Pa. Phone: Lombard 3-6714

FOR SALE

For sale—five Sphero valves 6", Fairbanks Company, Figure 0852; cast steel construction; 250 pounds pressure; ball plug, adjusting wedge and adjusting stems 18-8 stainless steel; seat rings copper-free niresist; stuffing boxes packed with supercutno, equipped with 8" series 30 end flanges, tapered ends for digester blowdown service. Original cost $1200.00 each. Make best offer. Buckeye Cotton Oil Company, Box 539, Cincinnati, Ohio, H. W. Hunt. F-15

FOR SALE

24—P & J dryers 48 x 160"
30 x 162" suction couch
14½ x 100" suction couch
1—3A Bird screen
1—No. 40 Adka Saveall with tank 13' 6" dia.
1—100" Pope reel (new)

FRANK H. DAVIS CO.
175 Richdale Ave., Cambridge, Mass
F-29

WANTED

Eastern firm interested in decorated bag conversion looking for sources of brown and colored light weight papers. Box 52-58 care Paper Trade Journal. F-15

WANTED—2—Slitters and Winders adaptable for paper and cellophane. Also Paper Coating Machine—LATEX COATING. When offering, give full particulars. Address Box 52-47 care Paper Trade Journal. NC

WANTED

A CLIENT OF MINE is interested in buying a paper converting operation. Located in New England, Eastern Atlantic States, South, Deep South, Central States, or Middle West.

I am hopeful this advertisement will catch the attention of an owner or company head: brokers recognized, correspondence welcomed.

My friend and his associates have great means. Retention of present employees contemplated.

Box No. 52-62 car Paper Trade Journal.
F-22

WANTED—Dryers, Evaporators, Digesters, W & P Shredders, Sheridan Presses, Slitters and any other Process Machines. Full particulars will be appreciated. P. O. Box 1351, Church St. Station, New York, 8. TF

SALES REPRESENTATIVES

STEEL CORE PLUG REPRESENTATIVE

Well established commission sales representative covering all mills, on a related line, to represent manufacturer of complete line of steel core plugs. Outline territory, present lines, references and experience.

Paper Core Plug Company
Kalamazoo, Michigan F-15

PAPER CONVERTING MACHINERY

Established commission sales representative calling on mills and converters, to represent manufacturer of paper mill and converting machinery. Outline territory, present lines, references and experience. All replies confidential. Address Box 52-56 Paper Trade Journal F-15

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GLASSINE — GREASEPROOF
ORDNANCE BARRIER
PLAIN — WAXED — LAMINATED
SPECIALTY PAPERS

THE HAMERSLEY MFG. CO.
GARFIELD, N. J.
PAPERMAKERS
75TH ANNIVERSARY
1877 - 1952

WHERE TO BUY

ABRASIVES
Norton Co.
Simonds Abrasive Co.

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Diamond Alkali Co.
The Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
The Goodyear Tire & Rubber Company
Monsanto Chemical Co.
Morningstar, Nichol, Inc.
National Starch Products, Inc.
Nopco Chemical Co.
Plaskon Division, Libbey-Owens-Ford Glass Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.

ADJUSTABLE SHAKE MOTION
Manchester Machine Co.
Rice Barton Corporation

ADJUSTABLE TILTING MOTOR BASE
Lovejoy Flexible Coupling Co.

AGITATORS
Apmew, Inc.
Appleton Machine Co.
Biggs Boiler Works Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Improved Paper Machinery Corp.
E. D. Jones & Sons Co.
Midwest Fulton Mch. Co.
D. J. Murray Mfg. Co.
Moore & White Co.
The Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.
Shartle Brothers Machine Co.

ALLOYS
Michigan Steel Casting Co.

ANTIFOAM
American Cyanamid Company Industrial Chemicals Division
Hercules Powder Co., Inc.
National Aluminate Corp.
Nopco Chemical Co.

APRON CLOTH
Williams-Gray Co.

BAG MACHINES
Dilts Machine Works
Potdevin Machine Co.
H. G. Weber & Co., Inc.

BALL MILLS
F. L. Smidth & Co.

BARK BURNER
Combustion Engineering-Superheater, Inc.
Nichols Engrg. & Research Corp.

BARK PRESS
Fibre Making Processes, Inc.

BARKERS AND CHIPPERS
Appleton Machine Co.
Carthage Machine Co.
Fibre Making Processes, Inc.
Improved Paper Machinery Corp.
D. J. Murray Mfg. Co.
The Noble & Wood Machine Co.
Valley Iron Works Co.

BARS
Dilts Machine Works
E. D. Jones & Sons Co.
Midwest Fulton Mch. Co.
The Moore & White Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

BASIC WEIGHT SCALES
Thwing-Albert Instrument Co.

BEARINGS
The Bagley & Sewall Company
Black Clawson Company
E. D. Jones & Sons Co.
Magnus Metal Corp.
The Moore & White Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
SKF Industries
Timken Roller Bearing Co.
The Torrington Co.
Valley Iron Works Co.

BEATERS AND JORDANS
Apmew, Inc.
The Appleton Machine Co.
Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Midwest Fulton Mch. Co.
Morden Machines Co.
The Noble & Wood Machine Co.
J. J. Ross Company
Ross Paper Machy. Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

BED PLATES
Bahr Brothers Mfg. Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Farrel-Birmingham Co., Inc.
E. D. Jones & Sons Co.
Lukenweld Div., Lukens Steel Co.
Midwest Fulton Mch. Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
Shartle Brothers Machine Co.
Valley Iron Works Co.

BELTING
Alexander Bros. Belting Co.
Goodrich, B. F., Co.
The Goodyear Tire & Rubber Company

BINS, STORAGE
Biggs Boiler Works Co.
The Marietta Concrete Corp.
The Noble & Wood Machine Co.

BLEACHING AGENTS
E. I. du Pont de Nemours & Co., Inc.
General Dyestuff Corp.
Rohm & Haas Co.
Virginia Smelting Co.

BLEACHING APPARATUS
Improved Paper Machinery Corp.
E. D. Jones & Sons Co.
Perkins & Sons, Inc., B. F.
Moore & White Co.
Niagara Alkali Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

BLOW PIPES & PITS
Carthage Machine Co.
Kalamazoo Tank & Silo Co.
Moore & White Co.
Murray Mfg. Co., D. J.
Walworth Company

BOARD MACHINES
The Noble & Wood Machine Co.

BOILERS
Babcock & Wilcox Co.
Biggs Boiler Works Co.
Combustion Engineering-Superheater, Inc.

BOTTOMS
Kalamazoo Tank & Silo Co.
Valley Iron Works Co.

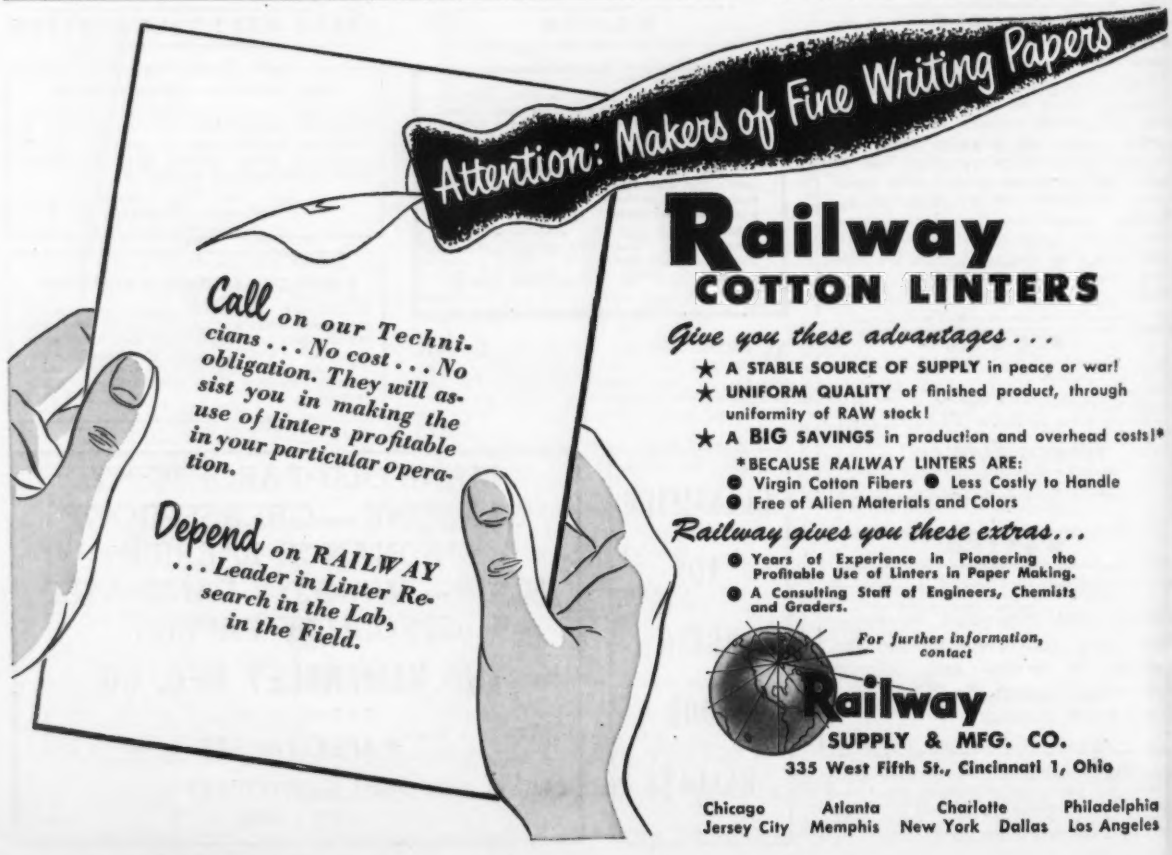
BOXBOARD SCALES
Thwing-Albert Instrument Co

BRUSH ROLLS
M. W. Jenkins Sons, Inc.
Gus Reidel & Son

BRUSHES
M. W. Jenkins Sons, Inc.
Gus Reidel & Son
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.

BURSTING TESTERS
B. F. Perkins & Son Inc.
Testing Machines, Inc.

CALENDERS
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Downingtown Mfg. Co.
Farrel-Birmingham Co., Inc.
Lobdell United Co.
Edward J. McBride
The Moore & White Co.
Perkins & Sons, Inc., B. F.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John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Industrial Chem. Div.
Hercules Powder Co.

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Dilts Machine Works
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Farrel-Birmingham Co.
Hamblett Machine Co.
Lobdell United Co.
Magnus Metal Corp.
Michigan Steel Casting Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Walworth Company

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Bird Machine Co.
Nichols Engrg. & Research Corp.
Ross, J. O., Engrg. Co.
Shartle Brothers Machine Co.

CHAINS
Jeffrey Mfg. Co.

CHEMICAL COTTON PULP
Hercules Powder Co.

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Diamond Alkali Co.
Dow Chemical Company
E. I. du Pont de Nemours & Co., Inc.
General Dyestuffs Corp.
Geigy Co., Inc.
B. F. Goodrich Chemical Co.
Gottesman & Co.
Hercules Powder Co.
Heyden Chemical Corp.
Hooker Electrochemical Co.
The Kinsley Chemical Company
Monsanto Chemical Company
National Aluminate Corp.
Naugatuck Chemical Division of U. S. Rubber Co.
Niagara Alkali Company
Nopco Chemical Co.
Pittsburgh Plate Glass Co., Columbia Chemical Division
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Virginia Smelting Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

CHESTS
The Bagley & Sewall Company
E. D. Jones & Sons Co.
Kalamazoo Tank & Silo Co.
Midwest Fulton Mch. Co.
The Noble & Wood Machine Co.
Shartle Bros. Mch. Co.

CHIP PACKERS
Fibre Making Processes, Inc.

CLEANING MATERIALS
American Cyanamid Company Industrial Chemicals Division
Diamond Alkali Co.
The Dow Chemical Company
E. I. du Pont de Nemours & Co., Inc.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Pittsburgh Plate Glass Co.
Wyandotte Chemicals Corp., J. B. Ford Division

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Lindsay Wire Weaving Co.

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Appleton Machine Co.
The Bagley & Sewall Company
Black Clawson Company
Farrel-Birmingham Co.
Hudson-Sharp Mch. Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Bros. Mch. Co.
Stephens-Adamson Mfg. Co.

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Gibbs-Brower Company, Inc.
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Moore & White Co.
Potdevin Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corporation, John
Weber, Herman G., & Co., Inc.

COATING MATERIALS
American Cyanamid Company Industrial Chemicals Division
The Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
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The Goodyear Tire & Rubber Company
Hercules Powder Co.
J. M. Huber Corp.
Monsanto Chemical Company
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.
Plaskon Division, Libbey-Owens-Ford Glass Co.
Reichhold Chemicals, Inc.
Wyandotte Chemicals Corp., Michigan Alkali Div.

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Manchester Machine Co.

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Fibre Making Processes, Inc.
Midwest Fulton Mch. Co.

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Bird Machine Company
DeZurik Shower Company
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Ebasco Services
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Shartle Bros. Mch. Co.
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Poirier Control Co.
Shartle Bros. Mch. Co.

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Egan, Frank W., & Co.
John Waldron Corp.
Dilts Machine Works

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Murray, D. J., Mfg. Co.
Ross Engineering Corp., J. O.
Shartle Brothers Mch. Co.

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Moore & White Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works
Waldron Corp., John

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Whiting Corp.

CURL TESTER
Thwing-Albert Instrument Co.

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Black Clawson Company
Dilts Machine Works
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Jagenberg-Werke Akt. Ges.
Moore & White Co.
Perkins & Son, Inc., B. F.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
The Smith & Winchester Mfg. Co.
Taylor, Stiles & Co.

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Improved Paper Machinery Corp.
Manchester Machine Co.
Rice Barton Corporation

CYLINDERS
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M. W. Jenkins Sons, Inc.

DAMPENERS
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Valley Iron Works Co.

DECKLE WEBBING
Williams-Gray Co.

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American Defibrator Co.

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General Dyestuff Corp.
Kinsley Chemical Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

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General Dyestuff Corp.
Kinsley Chemical Co.
Nopco Chemical Co.

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Hungerford & Terry, Inc.
The Permutit Company

DEMULSIFIERS
Wyandotte Chemicals Corp., Michigan Alkali Div.

DENSOMETERS
W. & L. E. Gurley

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Ebasco Services

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Diamond Alkali Co.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

DEWAXING CHEMICALS
American Cyanamid Company Industrial Chemicals Division
General Dyestuff Corp.
Nopco Chemical Co.

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Thwing-Albert Instrument Co.

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Biggs Boiler Works Co.
Blaw Knox Company
Chicago Bridge & Iron Co.
Combustion Engineering-Superheater, Inc.
Lukenweld
Pandia, Inc.
Paper & Industrial Appliances
Pusey & Jones Corp.

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General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

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Black Clawson Company
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Lobdell United Co.
Lodding Engineering Corp.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

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Bird Machine Company
Lodding Engrg. Corp.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Simonds Saw & Steel Co.

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Biggs Boiler Works Co.
Black Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Lukenweld
The Moore & White Co.
Murray Mfg. Co., D. J.
J. J. Ross Company
Red-Ray Mfg. Co., Inc.
Rice Barton Corporation
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

DRIERS—LABORATORY
The Noble & Wood Machine Co.

DRILLED SUCTION COUCH ROLLS
Manchester Machine Co.

DRILLED SUCTION DRUM ROLLS
Manchester Machine Co.

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The Bagley & Sewall Company
Beloit Iron Works
Bird Machine Co.
Black Clawson Company
Downingtown Mfg. Co.
Fairbanks, Morse & Co.
Farrel-Birmingham Co.
Jeffrey Mfg. Co.
General Electric Company
Gibbs-Brower Company, Inc.
Moore & White Co.
Murray, D. J., Mfg. Co.
Pusey & Jones Corp.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Bros. Mch. Co.
Valley Iron Works Co.

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Rice Barton Corporation

DRYER ROLL PYROMETER
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Thwing-Albert Instrument Co.

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M. W. Jenkins Sons, Inc.
E. D. Jones & Son Co.
Moore & White Co.
D. J. Murray Mfg. Co.
John Waldron Corp.

DUSTING BRUSHES
M. W. Jenkins Sons, Inc.

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Calco Chemical Div.
Bunge Pulp & Paper Co.
Ciba Company

E. I. du Pont de Nemours & Co., Inc.
Geigy Co., The
National Aniline Division, Allied Chemical & Dye Corp.

ELECTRIC HYGROMETER
Thwing-Albert Instrument Co.

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Egan, Frank W., & Co.
John Waldron Corp.

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Gibbs-Brower Company, Inc.
Holyoke Machine Co.
B. F. Perkins & Son, Inc.
John Waldron Corp.
Wheeler Roll Co.

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Raymond, Chas. P., Service, Inc.

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Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp.

ENZYMES
Rohm & Haas Co.
Vanderbilt Co., R. T.

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Goslin-Birmingham Mfg. Co., Inc.
Murray, D. J., Mfg. Co.
Swenson Evaporator Co., Div. of Whiting Corp.

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B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.

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Merrick Scale Mfg. Co.
The Permutit Company

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Huyck & Son, F. C.
Lockport Felt Co.
Morey Paper Mill Supply Co.
Shuler & Benninghofen
Waterbury Felt Co.
Waterbury, H., & Sons Co.
Williams-Gray Co.

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General Dyestuff Corp.
Nopco Chemical Co.

FELT CONDITIONERS
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The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works

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Gilbert & Nash Co.
Moore & White Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

FIBRE BOARD MACHINES
The Noble & Wood Machine Co.

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J. M. Huber Corp.
A. M. Meincke & Son, Inc.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

FILTERS
Bird Machine Company
Holyoke Machine Co.
Hungerford & Terry, Inc.
Improved Paper Machinery Corp.
Johnson Corp.
Moore & White Co.
J. O. Ross Engrg. Corp.
The Sandy Hill Iron & Brass Works
Walworth Company

FITTINGS
The Bagley & Sewall Company
Crane Company
Shartle Bros. Mch. Co.
Walworth Company

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Jeffrey Mfg. Co.
Lovejoy Flexible Coupling Co.
John Waldron Corp.

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Norton Co.

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Biggs Boiler Works Co.
Lukens Steel Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works

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Elwell Parker Elec. Co.
Towmotor Corp.

FORMATION TESTERS
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Williams Apparatus Co., Inc.

FOURDRINIERS
Beloit Iron Works
Black Clawson Company
Downingtown Mfg. Co.
The Moore & White Co.
Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

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Williams Apparatus Co.

GASKETS
The Goodyear Tire & Rubber Company

GEARS
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Black Clawson Company
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Frank W. Egan & Co.
Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Rice Barton Corporation
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Shartle Brothers Machine Co.
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Stroh Process Steel Co.
Valley Iron Works Co.
Westinghouse Electric Corp.
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Blaw-Knox Company

GRAVITY FILTERS
Holyoke Machine Co.

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Carthage Machine Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Lobdell United Co.
Norton Company
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Works

GRINDING WHEELS
Norton Company
Simonds Abrasive Co.

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Black-Clawson Co.
Egan, Frank W., & Co.
Gilbert & Nash Co.
The Moore & White Co.
Mount Hope Machinery Co.
Rice Barton Corporation
John Waldron Corp.

GUMMING MACHINES
Dilts Machine Works
Egan, Frank W., & Co.
The Sandy Hill Iron & Brass Works
Waldron, John, Corp.

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MODEL 28

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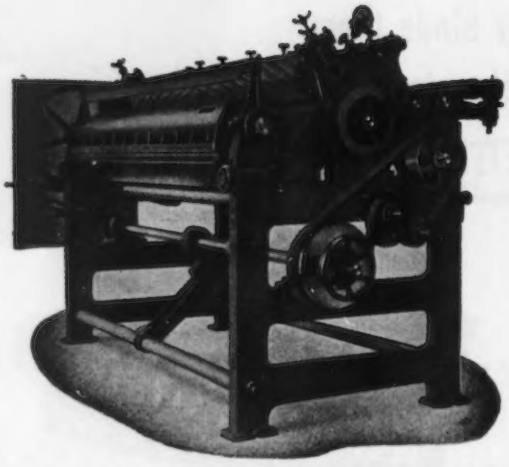

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Valley Iron Works Co.
Ross, J. O., Engrg. Corp.

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Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

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B. F. Goodrich Chemical Co.

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Thwing-Albert Instrument Co.

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Cambridge Instrument Co.
General Electric Company
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B. F. Perkins & Son
Taylor Instrument Cos.
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Williams Apparatus Co.

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Johnson Corp.
Lovejoy Flexible Coupling Co.
Rice Barton Corporation
Shartle Bros. Mch. Co.

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E. D. Jones & Sons Co.
The Noble & Wood Machine Co.
Shartle Bros. Mch. Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

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Dilts Machine Works, Inc.
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E. D. Jones & Sons Co.
The Moore & White Co.
The Noble & Wood Machine Co.
Simonds Saw & Steel Co.
Taylor Stiles & Co.
Valley Iron Works Co.

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Black-Clawson Co.
Fibre Making Processes, Inc.
Improved Paper Machinery Corp.

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Thwing-Albert Instrument Co.

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Bauer Brothers Co.
Biggs Boiler Works Co.
Bird Machine Company
Dilts Machine Works
W. & L. E. Gurley
Egan, Frank W., & Co.
E. D. Jones & Sons Co.
Taylor Instrument Companies
Testing Machines, Inc.
Valley Iron Works Co.
John Waldron Corp.
Williams Apparatus Co., Inc.

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The Bagley & Sewall Company
Dilts Machine Works
Egan, Frank W., & Co.
Rice Barton Corporation
John Waldron Corp.

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Dilts Machine Works
Gibbs-Brower Company, Inc.
Hamblet Machine Co.
Moore & White Co.

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Railway Supply & Mfg. Co.

LINTER PULP
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Sun Oil Company
The Texas Company
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Shartle Bros. Mch. Co.
The Wellman Engrg. Co.

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Lobdell Co.
Testing Machines, Inc.

MICRO-CRYSTALLINE WAXES
Bareco Oil Co.
Sun Oil Company

MOISTURE CONTENT CONTROL
Cambridge Instrument Co.
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General Electric Company
Reliance Electric & Engrg. Co.

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NOZZLES
Spray Engrg. Co.

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Shartle Brothers Machine Co.

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Black-Clawson Co.
Manchester Machine Co.
Rice Barton Corporation

PAPER MACHINES
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Beloit Iron Works
Bagley & Sewall Co.
Black Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Lukenweld
Moore & White Co.
Pusey & Jones Corp.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

PAPER MACHINES—LABORATORY
The Noble & Wood Machine Co.

PAPER MACHINE SLICES
Black Clawson Company
E. D. Jones & Sons Co.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.

PAPER TUBE MACHINERY
Dietz Machine Works
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson Sharp Machine Co.
Jagenberg-Werke Akt. Ges.
Langston Co., Samuel M.

PARAFFINE WAXES
Sun Oil Company

PARAFFIN WAX EMULSIONS
Hercules Powder Co., Inc.
Nopco Chemical Co.

PASTING MACHINES
Beloit Iron Works
Black Clawson Company
Dilts Machine Wks.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Murray, D. J., Mfg. Co.

Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

PEBBLE MILLS
F. L. Smidth & Co.

pH METERS
Cambridge Instrument Co.
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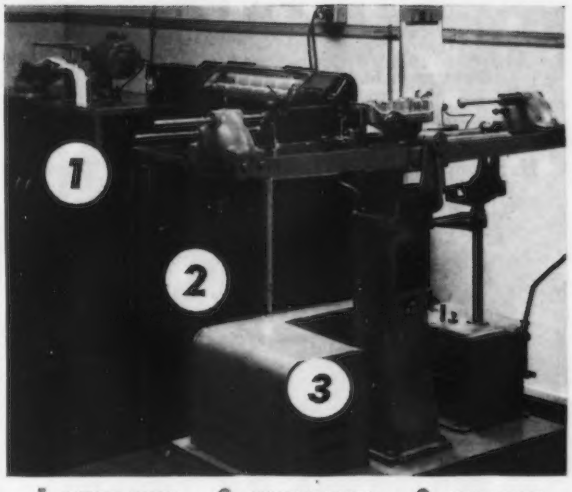

1 FATIGUE TESTER 2 ABRASION TESTER 3 YARN TESTER

For the moment, disregard the abrasion and yarn tester shown above and concentrate on the fatigue tester in the rear.

There, Gentlemen, is a laboratory instrument that starts out by straining a felt about the same as the operation of a paper machine would strain it; then, as the tests proceed, increases the tension many times more than would the action of any paper machine.

In this way, the toughness of the fabric is measured, from which findings Orr has learned to make felts tougher—far tougher.

Yarn and fatigue testing, as suggested by the other two instruments above, also plays important roles in the production of tougher and longer lasting felts.

Nor is that all—chemical impregnation of standard Orr felts tacks on still additional days of operating service.

And that is what Orr has done, and is doing to reduce paper mill felt bills.

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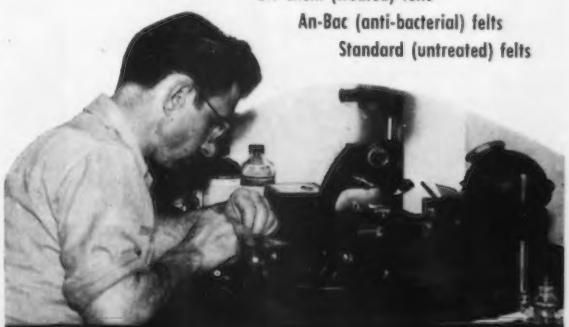

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